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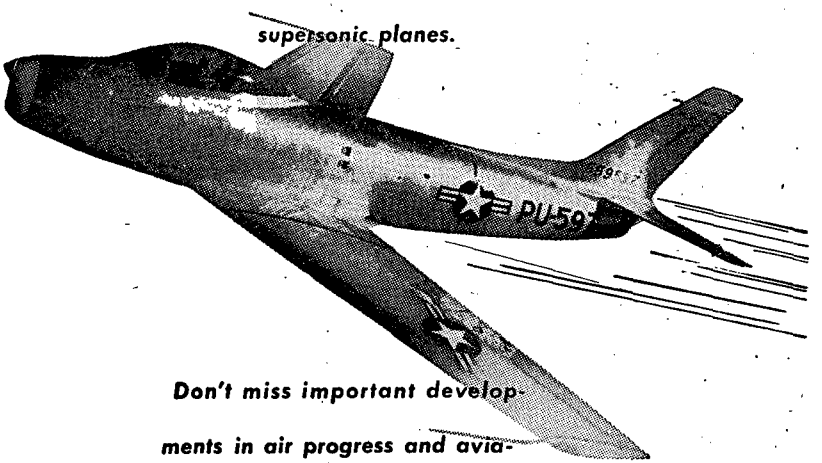

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JOHN W. CAMPBELL, JR.
Editor

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Editor
JOHN W. CAMPBELL, JR.
W2ZGU

Assistant Editor
C. TARRANT

COVER BY ALEJANDRO

Illustrations by Cartier, Orban, Quackenbush and Timmins

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DETECTION MEANS EXISTENCE

One of the basic premises of modern physical philosophy is that a phenomenon which can't be detected doesn't exist. The philosophy doesn't actually deny the existence of undetected things—it merely formalizes the proposition that you can't work with something if you can't manipulate it; if you can't detect its presence, it might as well be considered nonexistent. In radio work, the same thing is expressed by "if you can't hear 'em, you can't work 'em!" No matter how good your manipulatory equipment—whether radio transmitter, or atomic pile—may be, you can't get anywhere with something you can't detect.

The improvement in atomic manipulatory equipments—super-cyclotrons, atomic piles, and now we're heading into the begavolt—thousands of millions of volts—region—has necessarily been accompanied by an improvement in detection techniques.

The first method of detecting atomic radiation was, of course, a photographic film. Bequerel found the shadow of a key on a piece of film exposed to radiations from pitchblende. After that came the spintheriscope—simply a bit of fluorescent material—zinc sulphide—which glowed when a fast-moving alpha particle hit it. Next came the electroscope—which detected ionization produced when the fast atomic particles knocked chips—electrons—off of air atoms—and the Wilson Cloud Chamber. All of these were in use before 1920. Each has been improved, mechanized, and attached to modern electronic gadgets in one way or another, with the exception of the photographic film method.

At a recent meeting in New York, atomic instrumentation was both discussed and displayed—a meeting I found highly interesting. For one thing, the Geiger counter, now so familiar to everyone that even a newspaper can mention the term practically without explanation, is not the sole, undisputed king of detecting equipment many people outside the field believe it to be. The Geiger tube is extremely sensitive, and very useful in portable detection equipment particularly, or in routine laboratory work. But the Geiger counter has many failings; it

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works like a mousetrap, in that it goes off with a bang, but has to be reset before it can detect the next particle. That resetting period is short—very short—in human terms, but when radiation is fairly intense, and particles are coming rapidly, the Geiger counter gets snowed under.

Then too, of course, the Geiger tube is a sealed volume of gas; it must be completely, mechanically inclosed. That makes it impossible to detect very-low-energy radiations—the particles are stopped by the mechanical inclosure before they can enter the Geiger tube proper. Tritium—hydrogen of atomic weight 3—is slightly radiactive, producing a radiation of about 30,000 volts. The low-speed—atomically speaking—electrons from H^3 are so slow they won't penetrate even the thinnest "windows."

The Geiger tube fails on very rapid counting rates, and on very low-energy radiation. The ionization chamber works beautifully at any counting rate; it simply stops the ionizing particle from the radioactive material, collects it and all the ionized particles of air it has created, and continuously measures the rate at which charges are being fed in by the radiation. No mousetrap type release; it listens continuously to the mice going by and records their footfalls, and doesn't have to be reset. However, it takes a great deal more amplification to hear clearly the sound of mouse footsteps than to hear the snap of a mousetrap.

Similarly, it takes a great deal more amplification to "hear" the output of the ionization chamber than to pick up the output of the Geiger tube's discharges. Hence the ionization chamber is useful under two circumstances; where the radiation level is very high—and hence relatively large ionization currents are developed—or in a fixed laboratory, where masses of highly stabilized, super-shielded amplifying equipment can be set up on a weight- and - power - consumption - no - objection basis. At the show in New York, some newly developed, highly-stabalized amplifying equipment for detecting low-level radiation by ionization chamber methods was shown. The problem is a tricky one, because direct-current amplifiers are *extremely* difficult to build; these use "resistances" that any engineer would automatically call "high-grade insulation." A thousand megohms is a standard value.

The atomic piles are controlled, incidentally, by ionization chambers buried deep within the active pile itself.

But the ionization chamber, like the Geiger tube, is necessarily totally-inclosed. It won't detect tritium's low-energy radiation either. And at this point, we return to the first of all known detection methods; photographic plates. But the films used now are highly specialized, newly developed films of very spe-

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cial characteristics, for very special uses. They are specially designed to be as nearly free of "fog" as possible. They must have a very fine grain structure, so that microscopic detail can be studied. They are actually quite insensitive to light, and are designed to be put in direct contact with the radioactive specimen. Their uses and types are many; there are very thin emulsions for detecting beta-emissions from C-14 in biological and chemical work. There are emulsions of great, clumsy thickness, designed to be dense enough and deep enough to allow the full violent energy of a fission particle ejected from an exploding uranium atom to exhaust itself within the emulsion proper. Some of these emulsions are, incidentally, made up with uranium—probably some of them with U-235 itself—buried in the emulsion itself. Exposed to neutrons, full three-dimensional records of fissions can be made, and examined microscopically. The very minor alpha-particle of uranium is unimportant in such work, since any individual uranium atom has, on the average, a life of something over 2.5 billion years.

One of the most important uses of these special atomic-sensitive plates, however, is in biological research. When you feed C-14-containing medicinal material to a mouse, where will the C-14 show up? With Geiger counters, you can find that it has gone, let's say, to "the liver." But the liver is one of the largest organs in the body, and an extremely complex chemical plant itself; *where* in the liver? Well, make a microtome section of the mouse-liver, put the thin section on the sensitized plate, wait twenty-four to seventy-two hours and develop the plate. The liver now shows up as an auto-radiographic record on the plate, and microscopic examination can be made to determine which type of liver cells concentrated the drug. It permits of a detail of observation unattainable otherwise.

The importance of new detection methods is just as great as the importance of new manipulatory tools, so far as research work goes. A radio transmitter of a million watts power is useless with no receivers capable of picking up radio waves. But with a highly sensitive, highly perfected receiver at the other end, a 5-watt transmitter can—and has! —covered the whole planet. And detectors capable of working on atomic radiation are rapidly adding to the power of our research tools. A small quantity of C-14 is harmless —and sufficient, if sensitive detection is possible. But with inadequate detection methods, it might require so massive a dose of the radioactive material that the "experiment was a success, but that the test-subject died" might be forced into notebooks. With present methods, extremely valuable and important biological work is possible, and is being done.

THE EDITOR.

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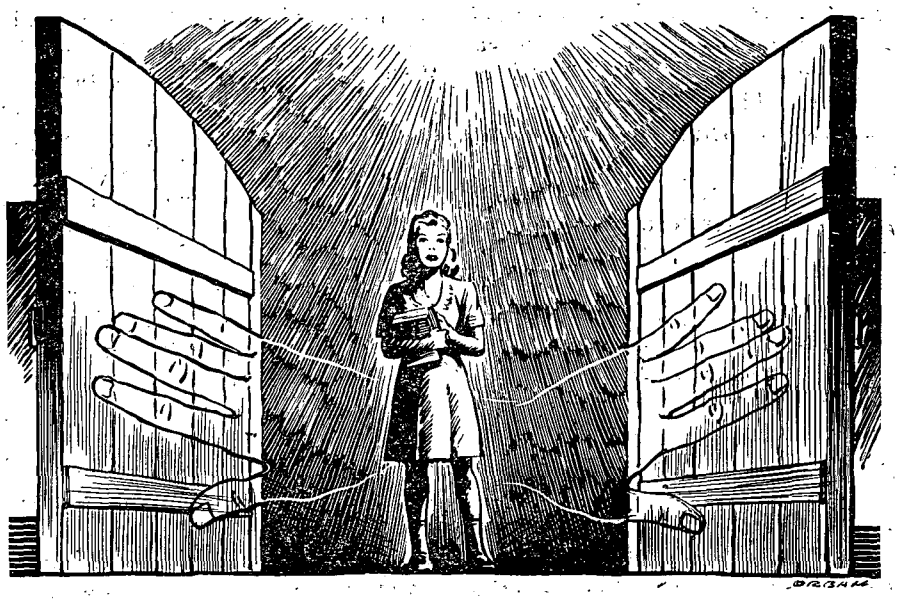

OPENING DOORS

BY WILMAR H. SHIRAS

Tim had been lucky; his grandmother didn't understand, but she was wise and patient. But others of Tim's strange breed were not so fortunate—others did not adjust—

Illustrated by Orban

Timothy Paul, age fourteen-next-Wednesday, and Dr. Peter Welles, psychologist-psychiatrist, were on their way to the post office.

Tim was bursting with excitement, but he said never a word. Welles, watching him silently, knew why. One word from either of them and the floods of talk which would be loosed would never do in public. For they were going to get the first replies to the advertisement which they had placed in newspapers and magazines covering the nation.

The advertisement had been drafted by Tim himself, and he was

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very proud of it. He was in a fever of impatience to find the other children who were like him—if they existed, as there was reason to hope. Welles had intended to use other means, and within a week expected his first report from the detective agency which was tracing the children of all the parents who had died after the atomic explosion of 1958.

"Orphans, b c 59, 1 q three star plus," read the advertisement.

"We'll get all sorts of crazy replies," Tim had said, "but I want it to be plain enough so they can't miss it."

"We can weed them out," Welles had answered. "We can sell the writers neckties by mail, or something of the sort. We can explain it all by saying that I, as a psychologist, wanted to see what answers a cryptic nonsense ad would get."

"The b stands for born, and the c for circa," Tim had explained, pointing. "And the 59 is the year; they must all have been born in 1959 or very close to it. The rest is plain enough; they'll all be orphans, and it makes a catchy first word."

"Yes," Welles had replied patiently.

"I didn't mean to explain," apologized Tim, abashed. "Excuse me, Peter. It's only that I'm so used to having people never figure anything out by themselves."

"This seems almost too plain," said the psychologist. "But we'll see."

Well, at the worst, they'd get replies about bright children, and it would not do any harm for Tim to get in touch with bright children, even if they were only in the IQ 150-200 class.

Peter Welles unlocked the post-office box, and without a word began to divide the seven letters it contained, one for Tim and one for himself, one for Tim and one for himself, so that the odd one fell to the boy. Peter marched quickly out of the post office, and when Tim—who went slowly, examining the outsides of the envelopes—reached the street, he found that the doctor had flagged a taxi.

"Speed is the need of the moment," remarked Welles.

Tim smiled with his lips closed. The psychologist saw that the boy did not dare part his lips, lest indiscreet speech burst out. It was always hard to remember that this child, whose intelligence surpassed that of superior adults, was still emotionally only about thirteen years old.

"Hold everything, pal," said Welles encouragingly. "It won't be long now."

When they reached the doctor's office, which was also his home, Tim leaped from the cab and tore inside. By the time Peter got there, the first letter had been opened and read.

"This one thinks we're looking for child stars for the radio or the movies," said the boy. "But she doesn't know why orphans, she says, unless there is something wrong with our proposition."

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"What shall we answer?" asked Peter, ripping open an envelope.

"Tell her we don't want the child's parents to get any of the child's salary," said Tim. "That'll settle her, all right. What's your first grab?"

"Thinks it must be some sex stuff, because it's cryptic," said Welles, tossing the letter into the fireplace.

Tim paid no attention; he was deep in the second letter which had fallen to him.

"This looks possible!" cried the boy. "It's obscure . . . but—"

"This one," interrupted Welles, "asks whether we are offering orphans for adoption or whether we want to adopt one. That's no good. But we must answer." He ripped open another, and cried, "Hello! This is in code!"

They read it together and laid it aside for the moment, with the other letter which had seemed possible but obscure.

"This one collects strange ads, so he says," Tim reported after a glance over his third letter. "Might be a possibility, but I don't think so. We can follow it up cautiously. And the last of all . . . hey! this is interesting, at any rate!"

He read the letter aloud:

"Dear Sir,

Your advertisement seems to deserve a wider audience, so I am broadcasting it over my short-wave set on the hour every hour this week. May I say that I take a personal interest in this matter? I would appreciate hearing from you further.

Jay Worthington."

"I think he's one," cried Tim. "That is, if there really are any more like me."

"Could be. We must figure out a reply to him; but it must be less plain than the ad, Tim. In fact, we'd better make some sort of reply to all the letters, just to be on the safe side."

"All but the one you threw into the fire," said Tim. "Let's see the code letter again."

They bent over it.

"Door-head tooth-head hand hook-tooth house-head-fish fish ox-serpent-fist-serpent—"

Tim began to giggle. In many ways he was a very normal small boy.

"—mouth-head-fish-sign-tooth door fish-prop ox-sign-water hand-back of the head goad-camel goad-fish-goad-hand."

"Anything else?"

"Not a word except the name and address on the envelope. Marie Heath—a girl!"

"There would be girls too, no doubt," said Tim, with elaborate carelessness which might have fooled the casual observer. "But why did she use this paper? It's folded like a greeting card. Open it all the way out flat, Peter."

Welles opened the paper to its fullest extent.

"Here's a bit of a scribble in pencil. A doodle. No, let me have a good look . . . Tim, it's Hebrew!"

"I don't know Hebrew. Do you? Then I'll stop in the main library

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before I go home, and transliterate it. Now for the obscure one."

Timothy read it aloud slowly:

"Dear Box Number:

It leaps to the eye that this is my cue. But perhaps you are as much in the dark as I am and it is probably better so.

B. Burke."

"Sounds promising," said Welles.

Tim muttered a moment and then exclaimed. "Better in the dark!" and fled from the room. By the time Peter Welles had got to his feet there was a shout from Tim, summoning Welles to his own bedroom, and there was Tim beckoning from the clothes closet. They shut themselves in the closet and in the dark they could make out words dimly luminous between the lines of typing:

"If there was a mental Boomfood in my bottle when I was a baby it might explain a great deal. Were others fed the same food? I must take this risk, I must find out. Beth Burke."

"Another girl," exclaimed Tim in triumph. "Look, we've found two already and I can't wait to see about this code. If we turn the Hebrew word into English letters it may help us; otherwise we'll have to ask somebody who knows the language."

"Run along, then, and give me a buzz when you have anything to report."

"Not over the phone," said Tim cautiously. "I'll get in touch, though."

"Don't you spring any codes on me, young fellow. If this keeps up, we'll have plenty of puzzles on our hands. Scamper! You need a good run."

"And how!" agreed Tim. He dashed off.

He was ringing Welles' doorbell frantically a little later.

"I've got it! When I opened the encyclopedia to transliterate the Hebrew letters, it gave the meaning of each character. Look—door is daleth, that's d, and head is resh, that's r—"

He had written it on a separate piece of paper.

"Dr sr y ws brn n—and the next must be figures. The letters have a numerical value too—1-9-50-9. It makes a good code, for there are no vowels. This means, 'Dear sir, I was born in 1959.' And then it goes on, prnts d ns—I don't know what that means—atm y q lg lnly. That's all."

"Parents dead, and I don't get the ns either; maybe the writer got a little mixed. The number values would be 50-60. But atm is atom, of course, and the next is, IQ large. What's lnly?"

"Lonely," said Tim confidently.

"Seems to me these are almost too easy," worried Welles. "But I suppose they wouldn't give much away to anyone who doesn't know about the Wonder Children." He caught his breath, but it was too late. Tim merely grinned.

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"So that's what you call us?"

"Not you, Tim. The rest of them . . . well, I had to call them something."

"Yes? I call them 'mine,' I think. I say to myself, 'can we find any more of mine?' But that really, too. Now we can fit names to some of them; but we ought to think up a proper name for the group, and use it, Peter. That is, if we ever get a group, really."

"Timothy, it's almost your supper time," said Welles, as the clock struck six. "Run!"

"May I write answers to them?"

"Yes, but don't send them until I see them," conceded the doctor.

Writing answers was the most delightful game that Tim had ever played. Boys and girls of thirteen and fourteen have very little privacy about their incoming mail; all letters must be carefully coded and "tailored to fit" the letter they were answering, besides. Tim worked in references to Shaw's "Back to Methuselah" and Wells' "Country of the Blind."

The first list from the detective agency came two days later, and Welles dismissed a patient hurriedly and went with long strides to the school where Timothy spent his days. The teacher of Tim's class, Miss Page, who had first noticed something extraordinary about the boy, had also been Peter's teacher a generation earlier. She raised an eyebrow when Welles beckoned to Timothy Paul from the doorway, but nodded permission for the boy to go.

Welles hustled the boy into the middle of the empty corridor where they could not be overheard, and spoke softly.

"I have the list—nineteen names on it, this first batch. One of them, a girl, is in an insane asylum. She's probably perfectly sane. I must go to her at once."

"She must have given herself away and nobody believed her," Tim was shocked and grieved. "You can get her out, can't you, Peter?"

"I don't know. She may be insane. And I have no right to interfere. But I'll do what I can."

"Can I do anything? Or did you just want me to know you are going away?"

"You can pray hard, Tim. And here's the list I got. Make out a letter we can send to all of them, if you want to. But hold it until I come back."

Tim glanced at the list and grinned.

"Here's one of my pen pals, Gerard Chase. I thought some of my pen pals might belong. I'll write to him, all right. Look, can I send all my pen pals a copy of the ad, and just say I saw it and isn't it odd?"

"Sure. Go right ahead on that. And get the mail, too, if you like. Here's the key to the box."

Timothy pocketed the key and went back to his eighth-grade class.

Poor kid, thought Welles as he hastened to the airport. Somehow

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he must meet all those other kids, before too long. But not this trip.

The asylum was a small private hospital, three hours away by plane. It had pleasant grounds, flowers, trees. Dr. Mark Foxwell was in charge. Could Dr. Foxwell see Dr. Welles? Certainly, sir; this way, please.

"Elsie Lambeth is a patient here, yes," said Foxwell. He was a big man, heavier than Peter by fifty pounds at least; perhaps fifteen years older. He looked as dependable as a rock, thought Peter. And kind; he looked kind and patient. Good!

"The fact is," said Welles, "I have been asked by a friend of—well, one might say, a friend of Elsie's parents—I'll explain it all later, Dr. Foxwell. Shall we say that I have a friendly interest in the little girl, although I did not know of her existence until this morning. My credentials—"

Foxwell glanced over Welles' professional credentials and nodded.

"Heard of you," he murmured. "What do you want to know? Or do you want to see the child?"

"If possible, I want to hear all about her," said Peter. "And I want to see her, later, if I may. In exchange, I can tell you of a very interesting case, doctor—a boy about the same age. I have reason to think the cases may be related."

"Fine!" said the big doctor heartily. "Elsie's case is puzzling, and that's a fact. Nothing I'd like better than some light on her case. The whole town knows all about it; you might as well be told frankly all I know. Her uncle is her guardian; the child's parents died when she was a baby. She was brought to us when she was not quite six years old—completely unmanageable, that was the complaint."

"Dangerous?"

"Not particularly; but violent. Tantrums, alternating with fits of depression and sullen spells. Abusive language—said everyone was stupid. Wouldn't play with other children at all. In fact, that was where the real trouble started. She wouldn't go to school. Before she reached the age of five, the chief problem was that she was always running away. But always to the same place. Where would you guess a child of three would always run to?"

"The library, in this case," said Peter.

"Humph! You must know something I don't." Dr. Foxwell, genuinely startled, rubbed his chin thoughtfully. "You never heard of Elsie until today? Who told you that?"

"Nobody," said Peter. "I told you I knew a case that might be similar."

"Well—the library. Yes. She'd take a book at random, open it anywhere, hold it upside-down as like as not, and look at it by the hour. Turning pages faster than any adult can read, but more slowly than an idle child would flutter the pages.

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The librarians would call her aunt, and down would come auntie in a rush. But that was no go. Elsie all but tore the place apart."

"Did she damage the books?"

"No, never. Smash a chair to pieces—push a table over—scream and rage and kick—but never damage a book. No, I take that back; she did once. Tore a book to shreds. She said it told lies. Child of three!"

"Did it?"

"I don't know. Before my time. But the librarian was used to children, and she told Elsie if she ever did such a thing again she couldn't come to the library at all. And then she suggested that, since the child was perfectly quiet while she was looking at books, that she be allowed to stay there if she liked. After that, when she showed up, somebody would phone her aunt, and on his way home from work her uncle would look in every night and see if she was there, and take her home to supper."

"Would she go quietly then?"

"Usually. Sometimes not."

"Depending on what she was reading, I suppose," said Welles. "And what happened when she was five?"

"She wouldn't go to kindergarten. Something like the old joke about the little boy who told his mother, 'All right, if you want me to grow up to be a bead-stringer, I'll go.' But Elsie wouldn't go. She might start off to school, but she seldom ended up there. She'd land at the library, or at the Junior College. The students used to smuggle her in, and she'd sit in back where the instructor could not see her. The students thought that was funny, to have her sit there and appear to take everything in. Trouble was, after the first week or so, she wouldn't be quiet. She'd shout out, 'Oh, you don't know what you're talking about,' or other little compliments of the same sort. She'd call the students stupid and silly when they tried to recite. One professor stopped his lecture to say that she'd better come up and teach the class if she knew so much, and Elsie said, 'I could do it as well as you, but would I get paid for it?'"

Welles chuckled. "Didn't he offer to pay her?"

"He didn't, but a few days later another instructor did. And Elsie said, 'It's no use; these stupid people don't want to learn anything anyway.'"

"Sweet child," murmured Welles. "Let me ask a question now. Did Elsie actually know anything herself? Did she ever prove that she did?"

"Not a thing we could ever prove. Sometimes she'd say, 'It's all in the book; can't you read?' or 'You've heard that often enough; any fool should know it by now.' But the child actually could read by that time, I'm sure. I didn't come on the scene until later. Well, the long and the short of it is that Elsie became a public nuisance. Even the

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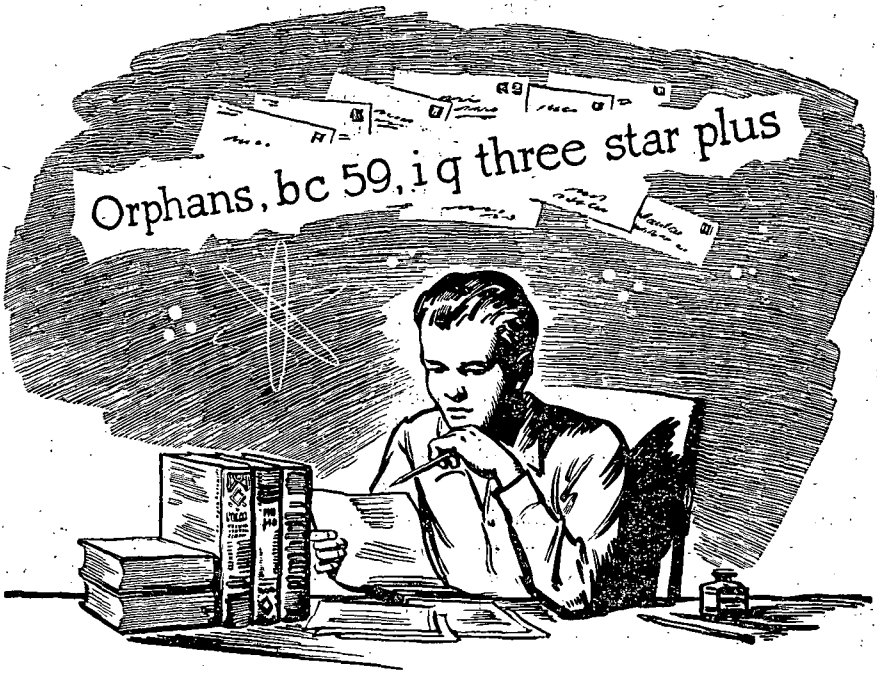
librarians got out of patience sometimes. Elsie was usually quiet at the library, but one day when people were getting out books she walked up and said, 'What do you want that junk for?' and on another day, when a man chanced to say to a librarian that only four people had ever read the Encyclopedia Brittanica through, Elsie popped up at his elbow and said, 'I'm the fifth and sixth, then. I've read it through twice.'"

Foxwell stopped to light a cigarette.

"You can laugh," he commented rather acidly, "but this isn't a joke. The child is here in this asylum because people didn't think it funny very long. Her aunt and uncle had no control over her, and finally they brought her here. She had been here a year or so when I came and took charge of this hospital."

"Didn't she run away?"

"They kept the child locked up. Had to. But when I came I took another line. Elsie, I said, you want to go to the library? Well, if you'll be a good girl, you don't have to be locked up. No running away, no tantrums, no naughty talk, and I'll let you go to the library and get books out every week. Then you can read them here, in your room or out in the nice big yard. Just so you stay on the grounds, Elsie, I said, and be a good girl. It worked pretty well. We had to lock her up



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a couple of times, until she saw I meant it."

"What does she do besides read?"

"She writes," said Foxwell. "A scribble nobody can make out. Looks liks some kind of shorthand. She keeps it locked in a drawer in her room and wears the key on a ribbon around her neck. I allow it, but once in a while she has to let somebody glance through it—make sure nothing out of the way is there, you know—matches or other contraband. She knows if she doesn't behave she can't keep it locked. Once in a while she goes through it and burns up a lot of stuff. That is, of course, somebody else burns it; she stands by and sees that it is done. She has a radio; likes it low, so we have no trouble about that."

"What's the diagnosis?"

"Who can say? We call it something for the books."

"What is her IQ?"

"We'll never know. She won't answer. Superior intelligence, no doubt, but not co-operative. She and I get along fine now, though. I know what she won't do and what she will do, and we get along fine. She won't talk, she won't answer questions, she won't take tests or play games. But she cleans up her room and makes her bed and all that, she has learned several kinds of handwork, sews nicely—makes some of her own clothes—she helps with the gardening, and she knows how to talk politely now. 'Elsie,' I said, 'no saucy speeches here; you've got to be nice to people, if you want us to be nice to you. Never mind what you think, you keep still if you can't talk like a lady.' And she makes polite small talk when her aunt and uncle come to see her, just as nice as anyone could wish. I told her she must answer when she is spoken to, be nice, and not be naughty and stubborn. There are no other children here, but Elsie doesn't mind that; she hates children. She doesn't mix much with the other patients, yet she seems to take a sort of interest in them. I started to tell her a little about the other cases, so she wouldn't be frightened at their odd ways, and she would listen as solemnly as a judge. It can't be coincidence, either, the little ways she helps with them. We have one wide-eyed old gal who always wants to run the power mower. Drives the gardener nuts, but Elsie will drop everything and get over there and do something to distract the old gal. The gardener swears that once when Elsie lured the old gal off, the child turned and winked at him."

"You think she is crazy?"

"She isn't normal. She doesn't behave normally. What do you mean, crazy?"

"Could she behave in a sane manner if she wished to?"

"Most likely she could. Where does that get you? Elsie doesn't wish to. She says she likes it here."

Foxwell went to the window and pointed.

"There she is, over there under

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the tree. Reading, as usual. Want to go over and speak to her? I don't promise she will make an answer, not one worth hearing."

"Small talk, such as she has been taught, eh?" mused Welles. "Does it ever sound like a caricature?"

"It usually does," admitted Foxwell. "I thought she was trying hard to please us. Maybe you're right—there was something a bit sarcastic about it, always. Or as if she is having a game with us. Humph! Want to hear about that case of yours! Well, come on."

The two men walked out into the grounds and advanced towards Elsie. She was absorbed in her book, and did not heed their approach.

"Good afternoon, Elsie," said Dr. Foxwell.

The child looked up, rose to her feet, and answered: "Good afternoon, doctor," in a sweet childish voice. She was a wiry little girl with black curls; she was dressed like any other child of her age.

"Dr. Welles, may I present Elsie Lambeth?"

"How do you do, Elsie?"

"How do you do?" The girl kept her finger in her book to mark the place. She was perfectly polite, completely disinterested.

Peter raised his eyebrows at Foxwell, who nodded, understanding the request.

"I have come here to see you, Elsie," said Peter. "I know a boy whose case is something like yours. So I came here to see if you are ready to leave this place. Dr. Foxwell says that you won't answer his questions or take the tests he wants to give you. Perhaps when you have heard my story you will think differently about things."

Elsie stared at him. She lowered her eyes after a moment, and the color rushed to her face.

"It's all right, Elsie," he went on. "I am going to tell Dr. Foxwell my story, and then we can send for you and tell you about it."

"You're going pretty fast," said Foxwell, nudging Welles. "She may not be ready to leave us. She may not want to live outside."

"There are problems about living outside, aren't there, Elsie? But perhaps we can solve them. The boy I am going to tell you about has solved them. But then he is a very bright boy."

The look Elsie shot at Dr. Welles made his smile as he nodded back at her.

"He had the breaks. But now things are going to break right for some other girls and boys. You'll listen to my story, won't you, Elsie?"

"I want to hear it first," said Foxwell, a little roughly. "Got to be sure it's worth telling her. Maybe she won't be much interested."

Welles winked at the child and turned to go.

The doctors walked off together in high satisfaction.

"Got her interested," remarked Foxwell. "But it's nothing to the way you've got me interested,

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Welles! Hints, hints! You must be very sure of yourself."

"We must not be overheard. Tim's case is secret."

"My office is completely sound-proofed."

"I'm sure you have already taken the hints?"

"Wouldn't be surprised if I have. You think Elsie is too bright and didn't have a fair chance to get adjusted. By the time I came on the scene, she had been here a year, and I couldn't do much with her."

"Do you think she is sane?"

"I couldn't prove it. Now, what's your case, Dr. Welles?"

They went into Foxwell's office and locked the door; and then Peter Welles told the story of Timothy Paul, whose intelligence was greater than any tests could measure, but who had lived "in hiding" as an average small boy. Under a system of pen names and aliases, Timothy had led several adult lives on the side, and not until recently had it been suspected that he had any secrets. Peter, now his friend, had his confidence. They were on the track of other children whose parents had been exposed to the radiations which might account for Timothy. And Elsie was one of those children.

Foxwell listened, agape.

"You think Elsie is shamming?"

"Hiding. She hasn't chosen the best way to do it, and by now it would tax a better brain than hers to find a way out. Her wilfullness and her quick temper got her into trouble before she was old enough to devise a wiser way to manage her life; and now what can she do?"

"What have you to offer, Dr. Welles?"

"If she can prove herself sane, she can be taken out of here and into a different environment. You have taught her self-control and good manners; she could easily make a new start where her record is not known. That would be my suggestion. But she is under your care."

Foxwell waved an expansive arm.

"She is under your care now if you can do anything for her. You think your Timothy could help her adjust?"

"Possibly," said Welles. "It would be worth trying. He wants to be a psychiatrist himself. And it would do him a world of good to meet some of the other children."

"I'd like to meet your Tim."

"Certainly you must meet him. And if we could take Elsie there and let them meet . . . but perhaps he should meet some of the others first."

Dr. Foxwell said slowly: "It might be best if he meets Elsie first of all."

Welles nodded. "I see. Yes, you are right."

"If she is sane, it will still take time for her to adjust," said Foxwell. "You must help me with it."

"I had hoped you would say that. And I hope you will be able to help me with the other children if I find them. It is too big a job for one man to handle; and not many would

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be qualified to do it. It must be kept top secret for a while."

There was a tap at the door; a nurse reminded Dr. Foxwell that dinner time was at hand. The men ate quickly and absent-mindedly, saying little. After dinner, Elsie was sent for.

The child was in her own room, nervously pacing about.

"Dr. Foxwell wants to see you now," said the nurse. "His friend is with him."

Elsie nodded obediently.

"I do hope you'll be good, Elsie," said the nurse pleadingly. "You've been such a good child lately. If you'd only talk to the doctor and answer his questions—"

"They are waiting," said Elsie sharply. "Why don't we go at once?"

"Well," cried the nurse, a little indignantly. "At least you're willing to go. Come on."

The nurse went with Elsie to the office and then was dismissed.

"Sit down, my dear, and let Dr. Welles tell you about the boy whose case is like yours," said Foxwell.

"No case is like mine," said Elsie.

"I think Tim is a little more intelligent than you are," said Welles thoughtfully. "He had all the breaks, and he made the most of them. Now things are breaking right for you."

"You said that before," said the child.

"I may say it again before I am through. But now for the story," and without further preamble, Peter plunged into the story of Timothy Paul.

Elsie listened with concentrated attention.

"Now, I know you are the child of parents who were also exposed to the same radiation," he concluded, "and who died of its effects not long after your birth. I think, and Dr. Foxwell thinks, that you are also sane and of greatly superior intelligence. If you are sane, you can leave this asylum and, under our direction, lead the kind of life such a brilliant girl should lead. But, if you are sane, you must prove it."

"Of course I am sane," said the child calmly. "I could have proved it any time these past five years."

"Why didn't you?"

"I didn't see what good it would do. I would have had to go back to school with a lot of stupid babies, and act like a little girl, and live with my stupid aunt and uncle. I can't be myself here, but I have more freedom than I would have outside. I was always unhappy until I came here."

"I am glad to see that you will answer my questions," said Peter, smiling at the child until she smiled back. "Weren't your aunt and uncle good to you?"

"They spoiled me rotten," said Elsie frankly. "Is that good? They didn't teach me to control my temper, or to be polite to people, or anything."

"They tried, didn't they?"

"Not very hard. My aunt always

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said she couldn't do anything with me. I was an awful brat. But grown people ought to have more control over a baby, even a bright baby. They didn't try to tell me things. I could have understood if they had told me. Dr. Foxwell did it right away. Why didn't they talk sense to me, the way he did? First they laughed and laughed and thought I was funny, and then they got mad with me. Stupids!"

"I don't think you behaved very wisely yourself, Elsie."

"Dr. Foxwell talked to me, and then I read more books, about how to bring up children, and about psychology. Then I knew how foolish I had been to be so naughty. But I couldn't think what to do, except to stay here."

"What is all this writing that you do?" asked Welles curiously.

"Poetry and stories and my diary and things. I am going to publish a lot of things when I get out of here. I meant to get out as soon as I was grown up, of course."

"What do you mean to do now?" asked Dr. Foxwell.

"I mean to get out of here and publish things now," said Elsie in some surprise. "Didn't you both say I could? Timothy Paul does."

"You'll have to behave as well as he does, and be accepted as a sane member of society," said Foxwell.

"Well, if I have pretended to be crazy for all these years," said Elsie tartly, "I can pretend to be normal if I like."

"What do you mean? Pretended to be crazy?"

"As soon as I saw where being uncontrolled got me, of course I knew how I ought to behave. But I had to keep on throwing tantrums and being sulky and not talking, so I could stay here in peace."

"You made the wrong adjustment, my dear," said Peter gently.

"I know that. I've known it for a long time. But I'm still only a little girl, and I couldn't stand living with my aunt and uncle and other children. They are all so stupid!"

"Elsie," said Dr. Foxwell, "I am glad to hear you talking so much; but you must erase that word 'stupid' from your vocabulary. It may be apt and it may not; but let's leave it out."

"Yes, sir," said the child obediently.

"Now about that writing," said Welles. "Can you write so people can read it?"

"Yes; but I had to have a secret writing for my private papers, or everyone would know I am sane. I'll copy everything out for you any time you want me to."

"You are sure the writings are sane?"

Elsie mused a moment.

"Yes, I am sure. Shall I tell you a little about them? A little is all I have time for, tonight, I suppose." She was plainly eager to tell, and the doctors urged her to go on talking.

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"There's one drawer full of things I found wrong in books and papers I read, and things people said; answers to magazine articles and book reviews and things that were wrong. I couldn't correct people out loud any more, so I wrote it all down. That got it off my mind. But no magazines would print it; most if it is out of date by now. Some books say the craziest things. And teachers, too. Some of those teachers at the Junior College—one of them said we couldn't know anything! He said there was no such thing as truth, and if there was, we couldn't know it, or ever know we knew it. Such crazy people, to try to teach! and—"

"Elsie," said Dr. Foxwell, "you must not call people crazy. That is not nice, either. Cut it out."

"A privilege reserved for you," said Elsie, with an impish grin which quite took the doctor's breath away. And then she added briskly: "You see you must not call me crazy either. I can even make jokes."

"You took the words right out of my mind," Welles joked back. "Go on. What else did you write?"

"I can't say the poems off by heart, and any other way would spoil them. But the play is nice. You'll like the play I have just finished. Do you like Shakespeare, Dr. Welles?"

"Er . . . yes."

"So do I—in some ways. But sometimes he is cr . . . I mean, I don't always like him as well as I do sometimes," said the girl sedately, her eyes twinkling. "I thought he missed a good chance to write about Cataline—"

"Cataline?" said Dr. Foxwell weakly.

"Yes, and Cicero, you know. So I thought I'd write a play like 'Julius Caesar,' about the conspiracy of Cataline, and put some of Cicero's grand speeches into blank verse, and —I thought it would be an amusing hoax if I could pretend it was really by Shakespeare, undiscovered until now, but a hoax would be dishonest, so I decided against trying it. It is my first play," she added modestly, "but I like it. It was such fun. I'm so glad that you can read it, both of you. The really hard part has been keeping everything a secret. If I can be free like Tim—my aunt and uncle were snoopy. His grandparents must be wonderful. They trust him, don't they? Would you trust me?"

"That shouldn't be necessary," said Welles. "You can confide in us, you know. Now, it's getting late, and we must send you to bed. If Dr. Foxwell gives you the tests tomorrow, will you take them properly?"

"Yes, doctor."

"And answer everything we ask you?"

"Yes, doctor."

"And then what shall we do with you?"

The little girl chewed her thumbnail and screwed up her forehead.

"You could tell everybody that Dr. Welles came to town with a new

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treatment," she said triumphantly. "He could talk to me and pretty soon you could both say the new treatment had worked. There are always new kinds of psychotherapy being tried."

"Elsie, do you practice saying these big words when you are alone?" groaned Dr. Foxwell.

"Of course. I had to learn how to talk, didn't I?" was the cool response. "Well—could I go and live near Tim somewhere? Would his grandmother help me? But no, you said she doesn't care for children, except her grandson. And I couldn't live with you, of course, Dr. Welles, because I'm a girl."

"She thinks of everything," marveled Foxwell.

"Of course I do," Elsie flashed back. "I may be crazy but I am not stupid. I . . . oh, doctor, please excuse me, I forgot!"

"Excused," laughed the big doctor. "Welles? Have you a solution to these difficulties?"

"There must be some woman with whom she could board," said Peter, "and I have one in mind. But there is no need to tell anyone about Elsie. She must copy Tim, and present a normal face to the world. We can explain that she has not been well, had a nervous breakdown or something, that she is spoiled and needs training, and that she must be allowed to amuse herself in any proper way like other girls. When Dr. Foxwell releases you, Elsie, we think you should be away from here, and go somewhere away from all your past."

"That was one reason why I didn't see any point in being cured," said Elsie. "This whole town would think everything I did was cra . . . was odd, no matter what I did."

"Will her guardians agree to let her leave town?"

"Her uncle will gladly pay her board and care anywhere. They are eager to do their best for the child, although they do not understand her—and I can't blame them, now I see that I didn't understand her very well myself."

"I must have been a very difficult child," said the girl.

"Yes, I think you were," said Dr. Foxwell.

"Bring on your tests," said Elsie, waving her hands. "But if I'm not sane, then I want to stay here. I don't want to pretend I'm sane if I'm not. How many other boys and girls are there? Can we all live together?"

"That's my dream," admitted Welles, "but it may not be possible. You are all children, and nothing can be done without the consent of your guardians. I'll see your uncle and aunt the first thing after the tests are finished tomorrow."

"They'll agree," said Elsie. Her eyes suddenly filled with tears. "They're dreadfully stu . . . slow, poor things. But they do mean well. And they'll be so happy to think I'm going to be all right. It's been hard on them, too."

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She ran out of the room, banging the door behind her.

The rest was easy. The next morning Dr. Foxwell gave Elsie the tests, and, as Timothy Paul had done, so also did Elsie. She went through the top of the IQ and C. M. tests, and on the Rorschach tests she gave normal, obviously unrehearsed answers which often made her examiners smile. Her uncle and aunt, when they were told as much as was good for them to know, were unfeignedly glad to know that Elsie could be "cured" and gave ready consent that she should move to be near Dr. Welles and under his care, as Dr. Foxwell recommended, and to board with any woman Dr. Welles suggested, to complete her adjustment to normal life.

Peter took the afternoon plane back, and reached his home city just in time to catch Tim leaving school.

"It's all right," he said. "It's all right. Come to my office after supper."

The boys were shouting to Tim to come and play ball.

"Yes, I'm coming," Tim shouted back. "May I go now, sir? Thank you, doctor," and he bounded away.

Welles watched him admiringly. The years of rigid self-control had wrought wonders. Nobody would ever have guessed that Peter had said anything of significance, anything to interest a boy whose schoolmates wanted him for a game.

The psychologist went into the school building and sat on Miss Page's desk. That brisk lady batted her eyes mischievously at him and asked concerning his health.

"I'm fine. And you, Miss Page?"

"Oh, fine, but getting no younger. Thirty-odd years of teaching age a gal before her time."

"I wondered . . . that is, have you any special plans for the summer?"

"No," said the teacher, stacking papers efficiently. "Nothing special. Can I do anything for you?"

"That depends. You see, there's a little girl . . . do you like bright children, Pagey?"

"That's hard to say. One meets so few of them."

"I'm serious for once. Many adults resent a bright child, and I need to find a woman who likes them."

"I have had one or two in my time," admitted Miss Page, "and I know what you mean. But I like them. There was one in particular—" her voice trailed off into silence.

"So you have found out that Timothy is brighter than most people think?" said Welles, gratified.

"I always thought he was. He wasn't the boy I had in mind. That one grew up to be a psychologist—but I'm beginning to think he isn't so bright after all."

Scarlet, Peter found himself laughing.

"Pagey, my love, my head is so full of a number of things that it has no room for me in it at all! Now, listen! Could you take this girl, a new patient of mine from out

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of the city, as a boarder for the summer? A girl of thirteen."

"A bright girl? Yes, I can, and gladly. How bright?"

"Too bright," said Welles. "A bit of a problem."

"You'll take care of the problem, no doubt. School is out in four weeks. When is she to come? Does she go to school?"

"She has not gone to school. Er . . . privately taught. She is not used to other children. That is one thing wrong with her."

"Bring her along, Peter. If she comes early, she can spend some time in my class if you like. It might do her good to visit school for a short time before vacation."

"It would, I think. But you'd rather wait until school is out, wouldn't you?"

"If the child needs your care, Peter, why not begin?"

"Pagey, you're a gem!"

When Timothy came to the psychologist's house that evening, he had three letters in his hand.

"I figured that ns out," he said, beginning to talk almost before the door was opened to him. "The letters shouldn't be together. The two should be separated. The n stands for *in* and the s is the date—60. Parents died in 1960, that's what it means."

Peter Welles, who had forgotten all about the code letter, stared in amazement for a few seconds. Then he got what the boy was talking about, and in the next second realized what desperate excitement must lie beneath this prepared talk of other things. He shut the door behind Tim and spoke quickly.

"The girl is all right," he said. "Everything is all right. We'll have to help her a little; but she is coming here to live with Miss Page for the summer. I've been telephoning

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to her doctor just now. Next Sunday he is going to bring her up here. Now, do you want to hear all the details?"

The boy hesitated.

"Would it be all right? I don't want to pry. Does she know about me?"

"Yes, she knows nearly all that I know about you—as much as I had time to tell. So does her doctor. I had to tell them, you see."

"Then tell me all about her."

An hour later, they remembered the three letters.

"This one is promising. A boy says he feels like Gulliver—he's always much bigger or much smaller than the people he is with, but he says he leaves it to us to guess which is mental and which is physical. That's Robin Welch. And this girl says she was aptly named Alice—her last name is Chase—that she is out of communication with everything even her own feet, and what was in that bottle labeled 'Drink Me' that she does not even recall having drunk. I think she belongs, too. The third is no good; it advertised a boarding school with special attention to orphans. Well, Peter, I have to start home; you know grandma's rules. When . . . when can I see Elsie?"

"Sunday evening at seven. We'll have to take her to Miss Page's first, and let her unpack and get located a bit. Dr. Foxwell and I will have her here for supper, I think, and you can come over right after supper."

They filled up the intervening days as best they could, with their separate daily routines, and with the writing of letters. Welles had explained to Tim that he intended to spend his vacation, in August, getting to see as many of the boys and girls as he could, but that for the present he could only pave the way by writing letters. Tim prepared a card index of possible names, and kept a file of information gathered.

Sunday evening! Timothy, scrubbed until he shone, presented himself with the punctuality of one who had been waiting outside for the exact moment, and he was introduced formally to Dr. Foxwell and to a shy, eager Elsie.

"Elsie has brought some of her writings to show you," said Dr. Foxwell, "and she hopes you can help her decide which to offer for publication."

"Take them into my study, you two kids," suggested Peter. "Have a drink, Foxwell?"

"Thanks, I will. Good idea, Welles," he added, as the children disappeared, "but I'm dying to hear what goes on."

"There would be nothing to hear if we sat and stared at them. Give them ten minutes. How is she doing lately?"

"Fine! Just fine! She spent every minute of her spare time working over this stuff she is showing him now. Amazing stuff, Pete! By the way—I've had an offer for the hospital. I've been thinking, maybe I could sell out and come up here. Join in the work, you know."

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The big doctor was talking very rapidly, and he accepted his drink without looking up. "Don't want to poach. But there's Elsie—"

"That's all agreed," said Welles. "Any time you can manage it. Elsie is your patient. But I think the two children ought to be kept together, and others with them if it can be managed. But how can we arrange things? Can we get the other children here? And how can we live, if we take too much time over the children?"

They discussed the matter briefly, but without coming to any conclusion. Their minds were not on the subject; and as soon as the ten minutes had elapsed, Peter got a pitcher of fruit juice and a plate of cookies from the kitchen, and led the way quietly to the study. The men paused by the open door and listened to the chatter of the children.

"This is great," Timothy was saying. "These poems—but they're almost too good, Elsie! 'The slow sweet curve of light'—that's grand! But I don't know if it would sell."

"I know poetry doesn't sell. I wanted you to see it, that's all. I'm typing out everything."

"That whole poem about infinity and creation, honestly, it's grand. This other stuff is good, and I think this novel will sell, too. There was a novel, 'The Snake Pit' and it made a big hit when it first came out, away back thirty years or so ago, or something like that. Yours, from the synopsis and first pages, is . . . oh, hello, Peter! and Dr. Foxwell."

"We thought you might like a little refreshment," said Welles, advancing with the tray.

"Sure—thanks," said Tim, pushing papers out of the way politely. "Say, do you know what Elsie has done? She has read all the books about all the sciences she could, and then turned them into poetry!"

"Is that good?" asked Foxwell, selecting a cookie.

"Is that good! Say, it's great! She tells you what things *mean,* you know! Not just the mechanism and the equations and all that, but what it's all about. She makes you see it. And she has three novels done, she says, and some are sure to sell. She showed me the synopses of them tonight, and a sample chapter. We'll have to think up a whole raft of pen names, Elsie."

"How many do you have, Timothy?"

"Oh, I don't know—I keep a card index of them. Couple of dozen, I guess. Have some punch?" Tim filled the glasses.

"You haven't typed out all the novels, have you?" asked Dr. Foxwell.

"No, not yet," said Elsie. "The rest of this here is articles and short stories and a lot of poems. I wanted to get the short stuff typed up first. May I have a cookie?"

When it was time to take Elsie home, Dr. Foxwell lingered in the hall a moment.

"Keep notes," he begged Welles in a whisper. "I've got to take the

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night plane back and miss all of this. But keep notes, son!"

"We'll never know the whole of it," Welles answered. "But what we have heard tonight . . . this past hour—"

"I'll run up next Sunday . . . no, Saturday," promised Foxwell.

Monday, Elsie sat quietly in class. Tim scarcely spoke to her all day, and she replied in monosyllables when he did. He went home without a glance her way; but he was at Miss Page's house ten minutes later.

Miss Page admitted him and left the children alone together.

"Listen," said Tim, "you've got to make friends with the other girls."

"I don't like them. They're silly."

"They can do a lot of things better than you can. Play games and things. Now, listen—you've got to, that's all, Elsie. You know what the doctors told you."

"I want to be with you, that's all," said Elsie frankly. "The others have no sense. And you didn't even walk home with me."

"Gosh, no! Do you want all the kids to say you're my girl?"

Elsie stared at him in horror.

"Of course not! That's stupid!"

"Well, you have to make friends. Miss Page made it easy. She told the kids last week, that a new girl was coming—"

"They don't like me. Noboby spoke to me, except 'Hello'."

"Miss Page told them you were shy, that's why. She said you hadn't been to school, and that you weren't used to being with other girls and boys, because you had been sick, see? They think you used to have heart trouble or something, and you're just getting over it. They smiled at you, I saw them. They're trying to be polite, and not rush you too much the first day. Now, listen! you've got to practice playing with them, and getting along nice—or I won't help you get things published."

"You don't have to," said Elsie, turning her face away. "There are other boys and girls like us. They may be nice to me."

"Isn't anybody going to be nice unless you are nice, too. You might as well begin," said Tim ruthlessly. "You think fine, and you write fine, but what else can you do?"

"I never had a fair chance," Elsie flashed at him.

"You're having it now," said the boy grimly.

They glared at one another for a minute defiantly, and then both began to laugh.

"All right," said Elsie. "I know I'm maladjusted, and I have to get right. You had a-head start on me, but I can catch up with you. Just give me a little time."

"We'll practice basketball for a while," said Timothy. "Come over to my place. I have a basket there to practice, myself. And then I'll show you my cats, if you like."

Peter Welles, who had reserved the last hour before supper for Elsie, was obliged to seek her out. He found the children at Timothy's,

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bent over the cat cages, admiring some kittens. But what were they saying?

"Are we dominants or recessives?" Elsie was asking earnestly. "Both my parents got the radiations, and both of yours."

"Yes, and so it can be recessive. We'll have to find out," Tim replied. "But we can find out if any of the others had only one parent exposed to it. If it's a recessive, you and I and some of the others will carry it double, but—"

"But if we marry outside the group, what then? No, we've got to know. And that is another reason for getting the whole group together."

"Statistics," gloated Tim, his eyes alight. "Bales and bales of statistics, graphs, charts, tests—too bad we can't experiment. Hello, here's Peter. I was showing Elsie the kittens. Look, I mated a silver Persian tom to one of these Siamese, and see what I got! Silver tabby!"

"They're the most beautiful of all," crooned Elsie. "I like short-haired cats best, anyway."

"You can have a couple of these," offered Tim.

"But Miss Page might not want me to have cats," the little girl objected.

"She won't mind. Peter can tell her you need pets," replied Timothy with assurance. "What did you tell her, Peter?"

"I told her that Elsie was very bright, very much maladjusted, and that she needed to live near me so I could treat her," replied Welles. "And I'd rather you two went easy when Miss Page can overhear you, but we may have to take her into our confidence before very long, if we take any steps toward having more of you children here. I still can't see how we are going to manage that."

"We'll think of a way," said Tim.

"Meanwhile, Elsie was due at my place half an hour ago."

The two children flushed.

"Oh, I'm sorry," she cried. "I didn't know it was so late. We've been playing ball, and then—"

Timothy also was trying to apologize, but Welles waved his hand and said he would forgive them this once. They finished off Elsie's scheduled hour in Tim's workshop, and he gave her some of his published writings to take away and read. The kittens, he said, would be ready to leave their mother in about a week, and Elsie could get Miss Page's consent meanwhile.

Peter did not see Tim for several days, but he knew the two children were together much of the time, discussing manuscripts, playing games, chattering constantly, and becoming well acquainted. On Friday he sought Tim out, and began to ask questions.

"Well, Timothy? Do you like her?"

"Oh, yes! I hope all the others are as good," said Tim happily. "It's wonderful to be able to talk to another person my own age and have

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them get everything I say, snap! just like that! no matter what I talk about. I can say anything I want to, just the way I can to you. She doesn't know exactly the same things I do, of course, but she understands everything."

"I wonder which of you is the more intelligent," hinted Peter Welles.

Timothy thought it over.

"I have been wondering that, too," he said, "and trying to judge; but it is hard to judge, being one of the two myself. I'd say we aren't exactly alike, so we can't be measured like that. She looks at things in a different way, you know. She wants to know what things mean, and I want to know what to do about things. We both have a lot to teach each other. Her memory and mine work differently, too. Of course we both read so much that we can't remember everything, or even a very big part of what we read; we remember the way we understood things, what they mean to us. She remembers sciences as if they were poems or pictures, and thinks about the significance of these things; but I remember the way things work, and think about inventions and social service and things like that, things she doesn't care about. I think of what practical use things are, and the theory of them. And yet in some ways she is much more practical than I am. She thinks about the philosophy of things and how they fit into the whole concept of everything. You can't measure any two people with the same yardstick, can you, Peter?"

"I guess not," laughed the psychologist. "Have you found out about her, some things I have been wondering? Can you tell me, perhaps, where she got that off shorthand of hers?"

"She told me," Tim answered. "When she was little, she saw that people did not print when they wrote; the letters were different from printed ones. But no two handwritings were alike, and she heard her uncle say he couldn't read somebody's else's writing; so when she was real little she thought everybody made up an arbitrary penmanship of his own. So she did, too. And then she found it so useful that she kept it up."

"Could it be broken as a simple substitution code, then?"

"I don't know; I haven't seen enough of it. Perhaps it could; at any rate, she never let people examine it carefully, you know, while she was in the hospital. She had some special signs for common words and frequent-letter-combinations, but mostly she spells things correctly; it is not a phonetic alphabet."

"And why did she hold books upside-down so often? Was that part of her pose?"

"I didn't ask her that, but probably she could read as easily one way as another. I can; can't you? I usually don't, because it looks odd; she may have done it on purpose to look odd. But everybody does it more or less."

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"And why would she always tell people they were wrong, but never tell them what was right?" asked the doctor. "She refused to instruct them. Why was that?"

Tim laughed. "She didn't say; but I think I know. She wanted to be right all the time. She despised others because they were stupid, but she couldn't stand the thought that she might make a mistake. I guess she read stories about demigods and magic princesses and stuff like that, when she was real little. Maybe she even got some idea that if she did make a mistake she wouldn't be so wonderful any more; sort of break the spell, or spoil the magic, or something like that. Anyway, I'm pretty sure that is what was wrong—she couldn't spoil this idea she had of herself as somebody who knew a million times as much as everybody else. Then as she grew older, and read more, and found out things, she must have found out how silly that was, and also she learned that other people she met—Dr. Foxwell for one—was much smarter than she had thought other people could be. So she wouldn't tell on herself. She's all right with me—she doesn't mind telling me that there are things she does not know, or can't do, or can't remember."

"I think she is all right, Tim. She must have been completely sane for some years, if not always. Perhaps she was a little queer for a while there, but I don't think it ever could have been called insane. Still, if you notice anything that I ought to know—we'll call Elsie your first patient, Tim—call me into consultation."

Timothy grinned. "I wouldn't keep anything from you, Peter. You're the doctor. She's making friends with the other girls at school. When is Dr. Foxwell coming back up here, Peter?"

"Tomorrow, I think."

"My grandmother wants to see both of you, while he is here," said Tim. "Can you come over tomorrow night?"

"Why, yes, I guess so. What's up?"

"Oh, she wants to talk to both of you," said Tim carelessly. "Grandfather is out of town this week end, or he would be there, too."

"We'll be over," said Peter.

The June days were long, and the doctors found Elsie skipping in at the gate as they neared Timothy's house. Her face fell when she saw them.

"Tim said I could get my kittens tonight," she said, "and Miss Page said I could come. Did you want me?"

"Not right now. We came to see Mrs. Davis," said Dr. Welles.

"I'll run ahead and ring the bell for you," said Elsie, suiting the action to the word.

"Big place," remarked Foxwell, looking about the grounds.

"Yes; Tim's grandparents are very well off, and he has a private workroom out back here, which used to be the garage. I'll take you out

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to see the workshop if there is time after we see Mrs. Davis," said Welles. "She probably wants to know who Elsie is, since the two kids have been spending so much time together. She lets Tim do about as he likes in some ways, but she is very strict about the company he keeps."

"How did he ever get away with so much? You say she has no idea he is anything out of the ordinary."

"She takes pains to see that he is a good boy and that he gets into no mischief. His writing and model-building and all that, she takes for ordinary schoolwork and boyish play, I suppose; she has never seen any of it. He convinced her that his cat-breeding experiments were the result of random curiosity. One can scarcely blame her for not suspecting anything like the truth."

Tim had opened the door, and was waiting for the doctors. They hastened their steps, and were taken into the house and presented to Mrs. Davis.

"And now you and your little friend may go outside and play," said that lady to her grandson, when she had received her guests. "Do sit down Dr. Foxwell, and Dr. Welles. I have a little plan—a proposal which I dare to think may interest you. And since your time is valuable, and I know that you have little of it to spare on this visit, Dr. Foxwell, I intend to come to the point at once. My husband is not in the city at present, but he is aware of the proposal I am to make, and approves of it. Timothy, my grandson, has told me that you two men wish to start an experimental school for children who are a little above the average in intelligence. There are a few schools in this country, I understand, which take children whose intelligence quotient—I believe that is the correct term?—is above 150. I do not know what figure you had in mind, my dear Dr. Welles; perhaps something less extreme; but children above the average, Timothy tells me. I understand also that your plans and methods are as yet untried, something rather new in education. But we have every confidence in you, Dr. Welles, and since Timothy has hinted that he might, because of your interest in him, perhaps be considered as a pupil in such a school under your management—" Mrs. Davis paused, and raised her eyebrows.

The astounded doctors exchanged glances.

"Yes," said Peter feebly, "Timothy would certainly be . . . er . . . considered."

"And he tells me that you know a great architect, Paul T. Lawrence," continued the good lady, after referring to a slip of paper on which the name was apparently written. "Do you think he could be persuaded to design the buildings?"

"Er . . . yes, I think he could."

"For many years, we have had it in mind, my husband and I, to build a memorial to my daughter and to her husband. But nothing suitable has suggested itself until now.

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Timothy's references to this plan of yours have interested us deeply, and we have actually . . . ah . . . pumped him; I believe that is the expression. Well, Dr. Welles, if you and Dr. Foxwell are agreeable, we propose to let you have the use of a large tract of land which my husband owns, just beyond the edge of town, and we propose to erect suitable buildings for the school, whatever you may require. Estimates, of course, and such business details, we must settle later. About how many pupils did you have in mind?"

"Not very many," said Peter, trying to keep his voice steady. "Perhaps not more than ten, to start with; perhaps as many as forty or fifty. I really must explain that it is all a dream of mine. I have made no effort to contact possible pupils for such a school. I—"

Mrs. Davis bowed graciously.

"I understand all that, Dr. Welles. We thought perhaps you would care to inquire as to possible students this summer, the building could be started in the fall, and the school opened the following fall, when Timothy would be ready to enter High School. I do not expect you to tell me immediately whether you will accept this offer of ours; I realize that you have made no definite plans, and that there must be an enormous amount of figuring to be done. Let me say, briefly, what it is I propose. The use of the land; proper buildings; but, for we must be businesslike, all to remain in my husband's name, leased to you at a dollar a year for a period of, perhaps, five years, with privilege of renewal at the same figure. Your salaries, and those of a suitable number of assistants, to be guaranteed for the same length of time; and expenses also guaranteed. You will perhaps wish to put some of your own capital into the venture, and in that case we can work out some arrangement of sharing the expenses and the profits; but to my mind this is not a money-making venture, but an experiment in education."

The doctors hastened to agree with Mrs. Davis.

"It is true, Mrs. Davis, that if any such school is opened, there may be no profit at all, but heavy losses," Dr. Foxwell said earnestly.

"I am aware of that," said the lady serenely, "but the land will remain, and the buildings; and when we have lost all we can afford to lose, we shall simply close the school. Meanwhile, Timothy and the other children will have had the benefit of your guidance. You are to be in full charge, Dr. Welles, subject to whatever state laws exist; I contract not to interfere with your management of the school in any way, provided of course that the state authorities have no objections to raise. You understand, Dr. Foxwell, that I address myself largely to Dr. Welles, and put him in charge, because he is Timothy's friend and we know him well; but I wanted you to be present when the offer was made, and to share in it, since Timothy told me the idea is partly yours.

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and that his new little friend, Elsie, would be one of the pupils. She is really a very bright little thing, isn't she? And such nice manners. And now, shall I tell my husband on his return that you are giving the matter your most serious consideration?"

Somehow the men stammered their thanks, and promised to spend the summer in trying to carry out her plans. Then Mrs. Davis dismissed them, saying that she knew it must be nearly little Elsie's bedtime—a statement which carried a definite hint that it was certainly nearing her grandson's bedtime.

"The children will be out with the cats," said Peter Welles. "We can find our way."

As soon as they were out of the house, the older man turned to Peter and demanded, "Does she mean it?"

"Certainly she does. The point is, do *we* mean it?"

"But how did she know?" marveled Foxwell. "She knows more than we do ourselves about our dream for the group! And yet she still hasn't the faintest idea what it is all about!"

"Don't let Tim hear you talking like this. It's as plain as ABC to him, and he expected us to get it in a flash. That's why he didn't even trouble to warn us."

"Oh! It's all his doing? But he is only a child. And Mrs. Davis seemed to think it would surprise him."

"He knows how to manage her, all right."

"But, confound it all! Are we to be managed, too, by a kid like—"

"By a kid like Tim, Foxwell, it's an honor. Don't worry; everything will be done right."

"I'll be darned if I'll be shoved around by a kid that size," protested the big doctor. "Why, we don't even know what he's doing!"

"It'll be your own fault if you don't. *Shh!* Here they are."

The children ran up to the men, and Elsie asked eagerly: "Doctor, what do you think caused us? I read that people never use more than a very small part of their brains. Do you think the radiation stepped up our brains so we could use more of them? Tim doesn't think that's it."

"Well, it's an idea," said Tim slowly. "I don't know much about it. Maybe we can rig up some tests to tell us more about it. Or it could be something about our glands, for all I know."

"I haven't the least idea," said Peter, "and I'd rather leave it for later. Tim, did you know what your grandmother wanted to tell us?"

Tim's eyes danced.

"I wouldn't be surprised. But she probably thinks I would. Well? Will you do it?"

"I sure will," said Welles, "and Foxwell probably will, when he calms down enough to believe it."

"It'll cost a fortune," objected Foxwell. "Your grandmother doesn't realize . . . why the archi-

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tect's fee alone will be—Who is this fellow she spoke of, anyway?"

"Me," said Tim. "She doesn't know that. Paul, comma, T for Timothy, Lawrence that's my middle name—Paul T. Lawrence, that's me. I'm not famous, but she thinks so. Anyway, I can do the buildings, and one of you men can represent me and oversee the workmen and the contractor. Now listen—I've got to go in soon. But I'll be drawing up the plans. Units of ten, I think, so we can build one or two, and more later on as we need them; it's better than starting with one huge building that would never be just the right size. A private workshop for each student, with a sink and a hood and some tables and chairs and shelves and cabinets—and the windows high, so nobody can peep in from outside—and glass in the doors like a regular school—the walls ought to be soundproofed, and—"

"Just a minute! How about classrooms?"

"We'll only have one grade. Sort of ungraded, rather. A high school, let's see—we'll have an auditorium, so we can put on plays and things, and we can have lectures and big classes there, and perhaps some small classes could meet in one of the workrooms, or outside, or somewhere."

"All you need is a log with a student on one end and a teacher on the other," muttered Foxwell.

"Well, sure. What we must have is lab facilities and quiet places to study and think, and a place where we can be together. Television equipment—we can listen in on lectures at the big universities all over the world. And a dormitory for

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the girls and women on this side—" Tim was sketching rapidly on a pad.

"Women!" shouted Dr. Foxwell.

"Miss Page, and whoever else we get," said Tim. "And the boys and men on this side . . . I suppose you'll both live there?"

"Us?" gasped the big doctor.

"Well, Peter, then, if you aren't coming."

"I am coming!" roared Foxwell. "Everybody said I could! Try and keep me out! But you go too fast for me, my boy."

"Gymnasium," Tim was scribbling rapidly, "and a swimming pool, maybe. We might build that ourselves."

"What are you going to use for money?" demanded Dr. Foxwell.

"Aren't you going to buy in?" asked Tim surprised. "I am, and I thought you'd all want to, and the other boys and girls surely will, too."

"I can't," wailed Elsie, her face suddenly crumpled in grief.

"Of course you can!" cried Tim. "Wait until you start selling, that's all. You—"

"Timothy, there are laws regulating schools," said Peter Welles.

"Oh, you can get away with anything around here if you call it an experimental school," said Tim carelessly. "Give it out as a high IQ school, and it won't matter what we do. All they ask is whether you can pass Subject A and have gym every semester. And enough bathrooms for everybody. I made it a high IQ school because then we won't have to hide so much, either. It gives us a lot more freedom. But we must be careful not to make a show of it."

"Suppose others try to get in? People who aren't of the group?"

"If they test high enough, we might let them in, if we have room. They'll give us a norm to copy in public, higher than we ever had before, so that will be a big help. And it will do them good. You know a person with an IQ of 152 is as far from the average as a person with an IQ of 48. And most schools don't do a thing for the kids above 120."

"Please tell me exactly what you plan to do," said Peter Welles, "and all about it. Skip the buildings."

"I don't know that I can," said Timothy. "I haven't verbalized it yet. It's all new in my mind, you see. I only began to think of it this week, because of Elsie. We've got to set them all free, you understand. We've got to set them all free right away. I thought I was in hiding and in bondage, but when I heard about Elsie then I knew we have to do something about the others right away. This school is the best way, because we won't have to hide so much—we can pretend to be about 150 instead of 100—and we can all be together, and you two doctors can look after us and straighten out anybody that needs it. If any of the others aren't free or aren't adjusted, it's a million times worse for them than it was for me, don't you see? And a school seems

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so natural. If we don't advertise it, I don't think we have to let in anyone who asks, and in any case we can have tests and say we have our quota full or that applicants don't quite make it. And don't worry about the money—it'll come in fast enough. I am sure that several of them have money already, like me, and once we are free we can all earn ever so much more. And don't you see, we've got to learn how to work together and help each other, all of us children? We can't wait much longer, or we'll all be set in habits of solitude and secrecy, so we'll never be right. We can be together, and be free and independent, and have friends, and be helped, and help each other, and all work toward the same things, and—"

Tim had been talking so fast that he ran out of breath at last and had to stop and gasp.

"Toward what things?"

Tim waved his arms.

"Towards whatever we have to do. For everybody."

"The things God meant us to do," agreed Elsie, who had been standing rapt, her hands clasped, taking it all in.

"Some of them may not believe in God," said Welles. "Many people don't."

Elsie turned on him swiftly and snapped: "I don't know how to talk about people like that if I can't say either 'stupid' or 'crazy'."

"Well, don't bite me; I'm a Thomist," replied Welles mildly.

"What's that?"

"I'll lend you the Summa tomorrow and you can read it through before lunch," replied Welles.

A bell rang violently in the workshop.

"My alarm clock," said Tim. "I've got to go in. I'll do the plans, and we'll get together pretty soon on all this."

"What do I have to do?" Peter Welles inquired. "It sounds to me as if you plan to do it all yourselves."

"Oh no, Peter!" Tim cried in alarm. "It all depends on you. You've got to front for us, and find the others, and be the teachers too probably."

"Teachers!" roared Dr. Foxwell.

"That's just it. We need Peter and you especially to teach us how to be what we ought to be, to keep us on the right track, to help us work together right; you can see what Elsie needed! Others too must need help dreadfully. And we are only children after all. Nothing takes the place of experience. You can weld all these individuals into one group where each can help all and yet nobody's individuality will be sacrificed—"

"Timothy! Timothy!" came the call from the house.

"Yes, grandma!" Tim shouted back. "I'm coming!"

"Good night, Tim," said Welles, pushing the others toward the gate.

"My kittens!" Elsie remembered, and Tim hastily selected two and thrust them into her arms.

The men took her to Miss Page's

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door in a silence broken only by the child's crooning endearments to the struggling, crying kittens.

"Good night," said Mark Foxwell to the child.

She looked up at him.

"Tim forgot to mention it," she said, "but the school will have to have a dining hall and a kitchen. We can use the dining hall for a classroom, sometimes. And we'll need a cook."

"Yes."

"My aunt is a wonderful cook," said Elsie. "My uncle can sell his grocery store and buy one up here. He can give us a rate on all the things we'll need to buy. And my aunt can do the cooking."

"Do you mean you want them to come up here and live near you?" asked Foxwell.

Elsie wriggled.

"I think they'd like to," she said. "And . . . I feel different now, about them. One can feel sorry for a hen trying to bring up a duckling—ugly or not!"

She ran into the house with her kittens.

The doctors went on to Welles' home without a word, except that Dr. Foxwell shook his head and muttered to himself occasionally.

"Well?" said Mark Foxwell, when his pipe was alight. "You've chosen, yourself, to go into this thing, if it can be done?"

"There is no choice," said Welles. "I have found my life work. These kids, barely into their teens, need all kinds of help and they need it the worst way. Somehow or other, within the next few years, they have to come out of hiding and get into the adult world. I'm going to do what I can to see that they have the chance to do it right. And Tim has given us the opportunity—laid the chance of a lifetime in our laps."

Foxwell shook his head slowly.

"That's true. Most kids with IQ's of over 160 have to adjust on a lower level in order to live in this world at all. It always seemed to me a great waste. And these—what will they be like when they grow up?"

"That's more or less up to us, now," said Peter Welles. "They need each other, they need us. Tim's right—Elsie shows us."

"You mean the others may be warped in all kinds of ways!" cried the big doctor.

"They may be. Some of them must be. The bright child has all too often grown up to be a queer, maladjusted, unhappy adult. Or else he has thrown away half of his intelligence in order to adjust and be happy and get along as a social being. These children are bright beyond anything the world has ever known—if Tim is at all a fair sample, and Elsie is full as well endowed. Think of such intelligence combined with a lust for power, a selfish greed, or an overwhelming sense of superiority so that all other people, of average intelligence or a little more, would seem as worthless as . . . as Yahoos."

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"Elsie—" began Dr. Foxwell in horror.

"Elsie is all right. She adores you, she obeys you and she follows the advice that you and I and Tim give her. She only needed to be set free. But the others—"

"It's an awful responsibility," said Foxwell. "And did you hear those kids talking about heredity, last week?"

"Yes," said Peter.

"They'll be so far above us when they are adult," moaned Dr. Foxwell, "I 'swear I'm afraid of it."

"Timothy Paul has the answer, I think. A school, where they can work together under our direction, and have as much freedom as they can stand, combined with the psychotherapy that you and I can give them where it is needed. They are much like normal children in many ways, I think—looking to adults for help, emotionally still children. But Tim has solved his own problems fairly well up to now, and I think he can help us with the school. I don't doubt that he has all his plans made, as to how the school is to be run, but he looks to us for the adult supervision and for the psychological guidance that the young people must have."

Foxwell rubbed his chin and shook his head, puffed at his pipe, found it had gone out, and relighted it.

"I'm beginning to believe all this at last," he said.

"It does take time to grasp the possibilities."

"Lectures by television," mused Mark Foxwell. "A private laboratory for each child. The students contribute to the upkeep of the place—invest their own money in it, money they earned in competition with the whole adult world, and . . . Pete, tell me, do you honestly think you can find enough of these kids to make a school?"

"You have met two of them. Timothy and I are in correspondence with at least half a dozen more, and Mrs. Davis gives us the school and guarantees all expenses."

"Where's your phone?"

"In the hall."

The big doctor lumbered out of the room. He returned in a few minutes and held a match to his pipe again.

Welles waited.

"I phoned the fellow that wants my hospital," Foxwell said. "It's sold. I can leave it in a month or so. Come on now Pete and let's do some practical planning! The kid is miles ahead of us already. Most likely he always will be, but I'd like to pretend we're the bosses for a few months yet."

THE END

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THE GLASS EYE

BY ERIC FRANK RUSSELL

The Invaders knew their superiority; they had ESP. They had great knowledge. But there's a difference between knowledge and wisdom—which they lacked!

Illustrated by Timmins

Their technique was the same as usual and found its justification in the fact that it had never been known to fail. Carefully the two Sagittarians circled the strange world at a distance too great for their own dull metal sphere to be observed. Then they swooped upon a lonely part of its night side, snatched a full-grown sample of its highest life form, bore him into space and picked him to pieces.

This vivisection was performed purely as a matter of caution. It had nothing to do with enmity or fear. The prime motive was to obtain essential information, to convert the unknown into the known, then weighed, estimated and understood.

So Qvord plied the instruments while Eenif coped with the resulting mess. The kidnaped creature exuded enough juice to paint a space sphere vivid red. It made many violent motions at the start, and gave forth a lot of sonic vibrations, but quieted down just before it died. Its body liquids were all over Qvord when he finished his task.

The unpleasant job done, they disposed of the remains in the disintegrator and esped them puffing like vapor into the void. Qvord thought his rough preliminary notes into the cerecorder.

"It had several layers of clothing, crude, not comfortable, with primitive fastenings. Its pink, soft-fleshed body had two arms, two legs, all of animal type. No tentacles. No extensible fibers. Its aural organs were two in number, small, immovable but reasonably efficient. The creature's sense of feeling was remarkably acute. It was totally lacking in telepathic power. It was equally devoid of esp, as a poor substitute for which it employed a pair of photosensitive organs similar to those used by the animals of Khar. Its small, inadequate brain relied wholly upon quasi-electro impulses from various organs, especially the visual ones. Beyond question an

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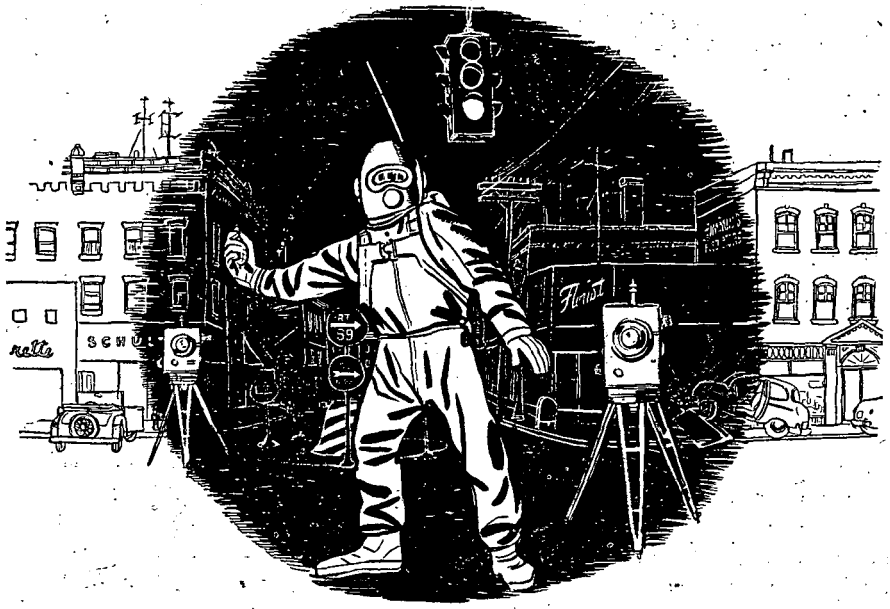

inferior type of life, easy to master and manipulate."

He switched off. His mind spoke inside Eenif's. "That will do for now. I put the last bit in to please you, the eternal optimist. I'll make a more detailed and accurate report after we have finished with this planet."

"The optimism is no more than contrast with your own everlasting pessimism which, I suppose, is the natural viewpoint of an incurably suspicious mind," commented Eenif.

"Cautious," Qvord corrected.

"All right, call it caution." Eenif gestured toward the metal wall through which both of them could esp the new world in all its glowing colors. "Without waiting for more data, I say this is an easy job. They are merely a gang of primitives depending upon crude, animalistic organs. Indeed, I doubt whether they're worth the bother of looking them over."

"It is precisely the inferior types which most deserve our attention," reproved Qvord. "Heaven preserve us from life forms too hot to handle! Besides, are not the inferior forms provided by bountiful Nature for higher forms to exploit?"

"Oh, yes, undoubtedly," Eenif agreed. "What I mean is that if we are not careful we can waste our valuable time on forms too low to serve any useful purpose. After all, one requires some degree of intelligence even in a slave." He indicated the world floating far beyond the wall. "I don't think

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so much of these pink bipeds."

"They are not without brains. We have seen their canals, bridges, machines in motion, seagoing vessels, aircraft and many other items indicative of intelligence at least good enough to make them satisfactory servants." Qvord brooded a moment. "If it comes to that, they may have more, far more than is apparent from here. More than seems pleasant in our estimation."

"There you go again," jeered Eenif.

"Anyway, the final decision does not rest with us," Qvord went on. "All we have to do is dig up sufficient information to enable the home world to decide whether or not the planet is worth mastering. For the time being let us be satisfied with what we've found. We could expend our lives in search of something better."

"Then let us land without delay. I am impatient."

"It is my turn to stay with the ship," Qvord reminded, "and yours to do the scouting around."

"I know, I know. It suits me fine. Last time, when *you* did the exploring, I was inexpressibly bored while waiting for your return. Caution, caution, caution. Be careful here, be careful there. You took twice as long as I would have done and went only half as far."

"But got all the necessary data just the same," Qvord riposted.

"Laboriously," topped Eenif. He jiggled his extensible fibers in the Sagittarian equivalent of rubbing one's hands together. "Let me get to work. I'll take the little transmitter we used against the animals of Khar. If it operates as effectively here, my task will be trouble-free."

"It will work the same, since their visual organs are the same," assured Qvord. "It will jam the impulses running along the nerves from visual organs to brain, blinding them as surely as if the nerves had been severed. They will walk blind in broad daylight, with eyes that see but are unable to tell what they see. They have no esp, as I have recorded. I can guarantee that! You will be perfectly safe within a broadcast sphere of general sightlessness. I doubt whether you need to carry any weapons."

"The transmitter is weighty enough," Eenif agreed. "Why should I load myself like a beast of burden?" Turning, he faced the metal wall, examined the world with his sense of comprehension that bore no resemblance to the lower form's sense of sight. "Dump me as soon as you like; somewhere along the rim of morning so that I can study them while they are active. It won't take me long."

"We'll land at once." Qvord went to the control panel. "Remember to keep within mental range so that we don't lose contact. I cannot make notes when you wander out of hearing, as you did on Khar."

"The metal mountain intervened, cutting us off for a few worthless moments. I have told you that dozens of times," Eenif grumbled.

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"Do not kill yourself with worry, Suspicious One! It won't take me long to gain the measure of these poor simpletons." He clung to a rail as the other swung the sphere out of its orbit and sent it plunging upon the new world. "Judging by that specimen you carved up, taking them in the mass will be easier than plucking fruit."

"It is our business to make certain of that," warned Qvord. He steered for the planet's morning line.

The Sagittarian sphere nestled in a hollow at fair distance from any habitation. A short, shiny antenna stuck from its top and poured out a constant stream of microwaves which lost zip and faded away about one mile from their source. Around the rim of that invisible hemisphere of one mile radius all things with visual organs were near the boundary between light and dark, the dividing line between sight and temporary non-sight.

Casually Qvord esped the few wild creatures entering the potent area. Rabbits and rats got scared, twisted and turned until either they escaped back into seeable regions or struck an unseeable obstruction and knocked themselves out. Birds in full flight swerved wildly, fluttered in aimless circles, sometimes found the light again, other times hit trees and dropped to earth. One snooping dog became lost in the pitiful maze of its own blindness until eventually it resorted to its nose and snuffled its way to the visible world. Qvord felt no sympathy, neither was he amused. He had esped it all before, on Khar. But he made careful note that nothing on this world, winged or legged, appeared to have any real sense of perception—only sight, poor, inefficient sight.

Most of the time he kept mental contact with the exploring Eenif, experiencing things through the medium of Eenif's mind, making detailed record of all that Eenif found. Already the other had been gone six days, and nine spools of data had been filled by the cerecorder. Fitting a tenth spool into the apparatus, he set it ready for reception, then broadcast the thought-ache to which Eenif would respond.

They were in touch immediately. He found Eenif about to enter another town. Two wrecked machines encumbered the street ahead of the prowling Sagittarian, evidently having collided as the approaching transmitter deprived their drivers of sight. Several bipeds were on the sidewalks, some standing with hands to their faces, others slowly feeling their way along walls and windows. A nearby glass-fronted building held a display of this world's merchandise over which shone curious, red-lit letters. Qvord made an exact copy of them as revealed through Eenif's mind:

BAXTER'S HARDWARE

With lordly indifference, Eenif progressed past the face-hiders and

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the wall-fumblers. In the next mile only one biped was seen walking with any assurance, this being an old, hairy-faced creature who tapped his way rapidly along with the aid of a white stick.

Eenif telepathed: "I tried to pry into that one to discover the precise function of his white rod, but his mind is completely blank to mine. They are all blank. They must think within a different band."

"No matter," responded Qvord. "It cuts both ways. Our minds similarly will be closed to theirs when —and if—we are their overlords."

"Yes, that is an advantage." Eenif came to the end of the street, reached a small square, stopped. Unhitching his transmitter, he put it on the ground, sighed with relief at the loss of its weight, had a slow, leisurely esp all around. Traffic signals changed color to one side of him. Already he had discovered the purpose of those. No automobiles moved in response. The few within the square were stalled and empty. There were no drivers in evidence. In fact there was not a biped nearer than those farther back along the street. The square was still, silent, strangely devoid of life.

"What is that?" inquired Qvord suddenly. "The queer object ahead and slightly to your right?"

Moving forward, Eenif examined the thing in question. It stood on three legs. It was a large box ornamented with numerous controls; a small, antennalike rod, and fronted with a crystalline port. The box part made ticking noises and revolved slowly but steadily in the horizontal plane. The peculiar little port passed across him four times as he stood there.

"Obviously an instrument of some sort," he commented. The object emitted a sharp click in response to an undetectable impulse from somewhere unknown. It ceased rotating, came to rest with its little port facing him. "Possibly a temperature or weather recorder."

"Then why has it halted—pointing at you?"

"Oh," said Eenif airily. "Nobody is attending to it. Nobody is attending to anything. They are all sightless."

"Who are sightless? There is nobody in that area!"

"What of it?"

"Eenif, do you suppose that this box on three legs might . . . might *not* be sightless?"

"Don't be silly," scoffed Eenif, waggling defiant fibers at the box. "Even a child knows how to make instrumental esp-boosters, but how in the name of Zaxt can any contraption duplicate a sense like sight?"

"I don't know," Qvord confessed. "I haven't the remotest notion. It seems impossible to me. But . . . but—"

"But what?" demanded Eenif.

"If it could see, answered Qvord, slowly and thoughtfully, "it might not be in a manner identical with the vision of the creatures who made it. There is every likelihood that

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it would see in a different, more mechanistic way. In which case—"

"Go on," urged Eenif, openly amused by the other's attitude.

"In which case your transmitter may not be affecting it."

"By the White Sun!" Eenif pretended to be aghast.

"We can make an easy test," Qvord went on, ignoring the other's characteristic reaction, "which will demonstrate positively whether or not it is looking at you—and seeing you."

"Qvord, I think you are the victim of your own lunatic anxiety. One cannot esp without using both sides of the brain. Similarly, one cannot see without using both visual organs. This gadget, as you know, has not got two of anything. Merely three crude legs and one black box with a shiny little opening, and various metal attachments that—"

"You are too dogmatic," interrupted Qvord. "We have never tested a creature with only one visual organ, but I consider it almost certain that such a creature might still see. So might that!"

"And you are too suspicious," Eenif retorted. "Where is the basis for your present leeriness?"

"It stopped. It's small, circular opening faces directly at you. That may be no more than sheer chance—or it may not. Let us test it."

"How?"

"Move round to the side of it," said Qvord.

Obediently, Eenif went to the side. The box gave forth swift ticks, rotated a quarter circle, stopped and stared at him blankly.

There was a long silence.

On the edge of the sidewalk the blinding transmitter continued to function. To one side the traffic signals changed color for the benefit of deserted, unmoving automobiles.

Eenif admitted, "That is strange." He moved right around the tripod. The box on its top ticked and followed him.

"I don't like it," decided Qvord, after a while.

"Why not? Even supposing that it does see me—which I won't admit—what of it? It is doing nothing about it, nothing at all. I have no objection to being looked at indifferently. Looks don't do any damage. Besides, they'll be able to study plenty of our kind before long."

"*I* can view what *you* are viewing," Qvord pointed out.

"Of course you can. We're in contact, aren't we? If you were unable to view through me it would show that something is wrong with your mind, and—"

Qvord's mental impulse had the strength of a shout. "So who is viewing through *that?*"

"Uh?"

"How do we know it is not transmitting what it sees to somewhere beyond range of your transmitter, outside the blind area where everyone can see?"

Sharply Eenif sent back, "You have an overactive imagination. Just

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because of that episode on Khar, you suspect anything and everything. Your idea that this piece of primitive trash may be seeing and transmitting is stupid on three counts."

"Name them," Qvord challenged.

"Firstly, there is no evidence of it."

"It follows you," reminded Qvord, "Almost as if it were watching you."

"That is not satisfactory evidence," said Eenif, dismissing it. "Secondly, there is no point in transmitting a scene to some place outside the blind area if those who witness it must come inside to do something about it. The moment they enter, they are blind! So where does it get them?"

"But listen—"

"Thirdly," Eenif continued stubbornly, "if this device is intended to reveal me, it must have been placed in readiness before I arrived. How could they possibly know that I would be here?"

Qvord gave the question much thought before he replied. "You have taken a direct route heading straight for where you are now."

"Most certainly I have. Since telepathic communication embodies no sense of direction, as you are well aware, I must take care not to get lost. What is simpler than to take a direct path along which I can retrace my steps?"

"I know all that," Qvord snapped. "In detailing your motives you are telling me nothing. Have you esped the interior of that box?"

"It was the first thing I did."

"What did you find?"

"Nothing that makes sense," replied Eenif carelessly. "Just a complicated jumble of components from which no reasonable purpose can be deduced."

"That may well be because you have tried to analyze the assembly in normal esp terms," Qvord opined. "Because neither you nor I can cope with alien technique or follow it in terms of a sight sense we do not possess." He mulled it over before he added, "I consider it a grave error for you to move in a straight path. Even at the risk of losing direction it would be better if you confused them by zigzagging a bit. That would introduce sufficient of the element of the unexpected to make them impotent."

"Them, them, them," jeered Eenif. He waved his fibers to emphasize the sheer emptiness of the square. "To what pale ghosts are you referring?"

"The ones who—if they've any sense—have marked the path of the blind area upon a map and noted that over the course of six days it has made a straight line. The ones who—if they've any sense—may suspect that the cause of the blindness lies at the precise center of the area." Qvord's mental impulses now had the sharpness of one whose wariness increases with further thought, further examination of the possibilities. "The ones who—if they've any sense—may extend that line to a site suitable for the placing of their trap."

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"Look at me," invited Eenif, striking a posture. "Trapped!"

"The ones who—if they've any sense—" Qvord went on inexorably, "will not spring the trap until they have traced the line backward to its origin and dealt with that! They won't want to scare me away by settling with you." In deliberate, ponderous thought-forms, he finished, "Eenif, they want me first!"

"Bah!" declaimed Eenif. "You are like a whimpering child when left alone. You frighten yourself with your own shadow."

With that, he gave the box a contemptuous shove. It crashed to the ground. He both esped and heard its components shatter.

Qvord said solemnly: "Too late."

"What do you mean by that?"

"The shadow already is here—listen!"

Eenif listened through the other's mind and hearing organs. There was an oncoming drone building itself up to a roar.

"It comes on wings through the blindness. Like your innocent box, it has a glass eye. It is remotely controlled. *It sees!*"

"Take off, you imbecile!" yelled Eenif, his self-assurance vanishing.

"I have. I am up, very far up, and going fast. But the winged thing with the glass eye was high at the start, and I cannot—"

The mind of Qvord cut off as a vast thundering oppressed his ears. Eenif sensed across the distance no more than a fragmentary moment of intense mental strain ending in fiery chaos.

Turning to snatch up his protecting transmitter, Eenif became aware of a biped nearby. His multidirectional esp would have warned him earlier had he not been concentrating upon the troubles of Qvord.

Standing squarely in the middle of the sidewalk, this blind biped was dressed in blue and bore upon his back a small case from which issued incomprehensible noises.

"It has just pushed over the nearest scanner but has not yet noticed the others. We can see it clearly from four directions. It has now turned to recover its apparatus. About twenty yards to your front. Swing your arm a bit. No, no, you're a fraction off the beam. Two or three degrees to the right. *That's it!—Let her go!*"

The sightless newcomer's arcing limb threw a small oval object. The thrower promptly fell flat on his face and hugged the sidewalk.

With the transmitter half-lifted, Eenif esped the oval object one-tenth of a second before its blast shook the street.

An adjacent automobile shed its windshield and windows. Water poured from its radiator, dripped on twisted pieces of apparatus, made thin wet lines between blotches of green goo in which still twitched a multitude of fibers.

Darkness fled as sight sprang into a square mile of Iowa City.

THE END

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THROWBACK

BY L. SPRAGUE de CAMP

It's nice to be a big strong man—or ain't it? He had a strong back, a good disposition, and was automatically assumed to be a little weak on intellect!

Illustrated by Cartier

"Thousand-pound men!" said the small-sharp-dapper type.

The tweedy-professor type handed the flask back to his seat companion and wiped his mouth with his handkerchief. He spoke loudly over the whine of the turbojets: "You've never been to the gigantanth reservation?"

"No," said small-and-sharp. "I seen pictures of 'em in a Sunday paper, but I never been on the ground in these Ozarks. Flown over 'em lots of times, but never had occasion to stop off until now."

"My dear chap! After you've signed up your football players in Springfield, drop over to Mushogee and I'll take you out to the reservation."

"How do I get there?" said small-and-sharp, a little dubiously.

"There's an airline, but if I were you I'd take the train. You can't really see the country whizzing over it ten miles up." The speaker took a card and scribbled on it. "Here you are. I'm Frybush; teach anthropology at Toronto University. I'm down here to look at the gigantanths myself."

"My name's Grogan; Oliver Grogan," said the other. "Manager of the Chicago Wolves." They shook hands. "Wouldn't there be any . . . uh . . . danger? Those thousand-pound ape-men don't sound like the kind of guys you'd ask in for a friendly game of stud."

Professor Frybush snorted. "Not at all. The government agent watches them, and any that turn mean are shuffled off to where they can't bother people."

"You mean they bump them?"

"No! I told you the courts have held *Gigantanthropus* to be legally a human being, with the rights and

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privileges of such. They just move them to another part of the reservation where they can't pull arms and legs off normal-sized visitors when they lose their tempers." Grogan winced visibly, and Frybush continued: "What's the matter, don't you want to go? You don't have to; I just thought that since you produced that drink when I really needed it I'd do you a favor in return. Speaking of which—"

Grogan passed the flask again. "Oh, sure, I'll go. Glad to. But

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say, where did these things come from? I thought things like that got extinct a million years ago."

Frybush clucked. "They did, but they were re-created."

"How can you do that, huh? I don't want nobody re-creating a dinosaur or something in my backyard."

Frybush smiled. "Ever hear of the brothers Heck?"

"Nope."

"They were a pair of Hungarians who re-created the extinct aurochs a couple of centuries ago."

"Come again? The extinct what?"

Frybush looked down through the port at the flat brown earth far below, in which the river systems made little sets of lines like the veins in a dead leaf. "The aurochs was a big wild cow that lived in Europe down to about 1600; something like a Texas longhorn. Although the aurochs was killed off in a wild state, it had interbred with domestic cattle, especially in Spain and Hungary. So the Hecks collected modern cattle that showed traces of aurochs blood and bred back to the ancestral form. It proved easier than they expected; in a few generations they had a herd of real aurochs. You can see the brutes in parks in Europe today."

"You scientific guys," said Grogan, "sure think of crazy things. Is that what they did with these gigan . . . these ape-men?"

"Roughly speaking, yes. When extra-uterine gestation—test-tube babies to you—was perfected after the World Wars, an American named Huebner saw a chance to re-create fossil men in the same way, so he started collecting volunteers who showed traces of Neanderthal et cetera blood. Here's Goldilocks again."

The hostess was saying in a clear elocutionary voice: "We are about to land at Springfield, Missouri. Passengers for Springfield will kindly secure their belongings. All passengers will fasten their safety belts."

"Go on," said Grogan, reaching up for his hat and raincoat.

"Well," said Frybush, "it took a lot longer than the aurochs, because that inheritance is harder to find among human beings, and because a generation among men is several times as long as among cattle. However, they succeeded finally; Huebner's great-grandson was in charge of the project when it closed. So that's how we have a reservation in Spain with Neanderthal men, one in Oklahoma with *Gigantanthropus,* et cetera."

"What do these ape-men do?"

Frybush shrugged. "A little simple farming, which is about all most of them can be taught. Here, give me another drink; I hate these roller-coaster landings."

Grogan grinned a superior grin and looked at his watch. "Like to make a little bet as to whether we touch before or after the scheduled time? Say a hundred bucks?"

"Ow! Then I *would* be sick!"

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A week later Oliver Grogan looked up Professor Frybush in his hotel in Mushogee and said: "Say, Doc, how about taking me out to see those ape-men like you offered?"

"Sure thing. How'd you make out with your football players?"

"Lousy. Didn't sign up a one. The hillbillies ain't what they used to be."

At the entrance to the reservation the professor signed Grogan in. The little man, his bald head glistening with sweat, had been getting more and more nervous during the ride, and he was not reassured by the sight of a couple of large rifles in the gatekeeper's house.

"How far are these gi . . . gigantanths?" he asked.

"There's one village half a mile down the road. Easy walk."

"You mean we gotta walk?"

"Sure. They don't permit cars."

"Don't they send a ranger or somebody along?"

"Not with us. They know me, you see."

Grogan had to puff to keep up with the professor, who had suddenly turned into much more of an athlete than he looked.

After a five-minute walk he suddenly hung back. "What's that?"

"That" was a strange, faint vocal sound, a rumble like a lion warming up for his evening roar.

"Just one of the boys," said Frybush; and after a while: "Here are some of them now."

The grass had been cut over an area of about an acre in a little hollow, and about this area were five great hairy creatures, four male and a female. Two of the males and a female lay on their backs and snoozed, while the remaining two males played catch.

Grogan did not realize how big they were until he got close and had to look up at their faces. They were about nine feet tall, more massively built than ordinary men, and showed the brutish, protruding faces and stooped posture of the ape-men in books on evolution. Grogan realized with a sick feeling that the ball they were throwing and catching with one hand was a small medicine ball.

"Hey, George!" called the professor.

The nearest ape-man looked around, grinned gruesomely, and shambled over. "George," continued Frybush, "I want you to meet my friend Mr. Grogan. George Ethelbert, assistant chief of the northern tribe."

Grogan mistrustfully put his hand in the monster's. It was like shaking hands with a three-year-old baby in reverse. Grogan, grinning a little foolishly, said: "Me come from Chicago. Fly in big bird. You got-um nice place."

The ape-man wrinkled his low forehead. "What's the matter, mister?" he rumbled. "You a foreigner or somepin?"

"Why I' . . . I didn't know you guys spoke good English," said Grogan. "I guess you like this better

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than all those mammoths and things, huh?"

"Huh?" said George Ethelbert, turning to Frybush. "Prof, what's wrong with this guy? I never seen a mammoth in my life, except a picture in a book once."

"Excuse me, excuse me," said Grogan. "I thought . . . well, you know, different, like those things that lived—Oh, skip it. You do the talking, professor."

Frybush said: "How about showing us around, George?"

"How about letting me off and having Zella do it for once?" said Ethelbert. "I'm having a good little game here."

"O.K."

"Zella!" roared Ethelbert. When the female kept on snoring like a thunderstorm, he wound up and threw his medicine ball, which bounced off her ribs with a sound like hitting a bass drum.

"Why, you—" howled the female, rolling to her feet. "I'll fix you, you—" and she charged like an angry elephant. Ethelbert at the last minute sidestepped with an agility astonishing in so large a creature and let her blunder past. She almost trod on the two normal men, and both monsters laughed at the sight of Frybush and Grogan dodging. The female, temper apparently soothed, hit Ethelbert a slap on the back that would have felled a rhinoceros. "O.K., I'll show these shrimps around, and then I'll put a snake in your bunk to show you how to treat a lady. Where do you twerps want to go?"

"Professor," said Grogan in a low voice, looking cautiously at the hairy back of Zella trudging through the dust in front of him, "she reminds me of my second wife. I know I made a sap of myself, but I got the idea from what you said that these people would be kind of feeble-minded. They don't sound that way."

"That depends on the individual," said Frybush. "They're not really pure *Gigantanthropus,* you know; it would take many more generations to breed out all the human genes. What's more George is unusually bright for a gigantanth; practically a genius, which makes him about as intelligent as an average human being."

"Hm-m-m." Grogan walked in silence, thinking, while Zella pointed out the huge barn and huge log cabins. The latter moved Grogan to say: "Seems pretty crude, professor. Wouldn't it be simpler to send houses out from the city by truck? A couple of good workmen could run one up in a day."

Frybush shook his head. "That's been tried, and it nearly ruined the throwbacks. Made 'em lazy, or discouraged 'em from doing anything for themselves. Better to live by their own efforts, even if they're not efficient at it."

Further on Frybush said: "Look, Mr. Grogan, I've got some educational matters to discuss with Zella Why don't you wait here? You can

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sit on that bench, or wander around; you're safe."

"O.K.," said Grogan resignedly, still not caring much for the idea. When they had gone he shuffled about in the sleepy sunshine, the dust of the unpaved street frosting the shine of his city-slicker shoes. He was getting bored; the place was only a backwoods farm with everything twice natural size, and farms did not appeal to Oliver Grogan. He yawned and stretched out on the hand-hewn bench for a minute of shut-eye while the prof did his business.

He had barely closed his eyes however when a voice said: "Hey, you!"

Grogan looked up, then sprang to his feet. Before him stood another of the creatures. From its size and comparative hairlessness he judged it to be a child of the species. Grogan, who knew little about human children even, guessed its age as about twelve. At any rate it was almost as tall as he was and much heavier than his one hundred thirty pounds.

"Yeah?" he said, backing against the bench and wishing the prof would come back.

"You another shrimp, ain't cha?"

"I suppose so, if that's what you call normal people."

"You come witih the professor?"

"Yeah."

"Gimme some chewing gum, will ya?"

"Don't have none."

"Aw come on! All shrimps got chewing gum. Why won't cha give it to me?"

"Lemme alone. I tell you I ain't got none!" Grogan began to sidle around his tormentor to get room to run.

"Aw come on! Why won't cha? I ast ya nice, didn't I?" The boy caught the sleeve of Grogan's coat.

Grogan jerked his arm, trying to wrench his sleeve loose. When that failed he kicked out in panic and hit something hard.

"Yeow!" bellowed the boy, letting go of Grogan's coat to hop on one leg and hug the injured shin of the other. Grogan ran in the direction he had seen Frybush go. He heard the pound of the boy's big feet behind him, and its voice yelling rude words. Then thick arms caught his legs and spilled him prone in a flying tackle, and huge fists began to pound his back.

"Help!" he screamed, burying his head in his arms.

"Get offen there, you!" roared Zella's voice, and Grogan felt the boy plucked from his back. He rolled over in time to see Zella hoist the boy by the neck with one hand, while with the other she gave it a terrific swat on the fundament that tossed it twenty feet. The boy scrambled up and burst into tears.

"I'll fix you, Zella," it said, "and I'll . . . I'll fix that shrimp, too! All I do is ask him polite for some gum, and he kicks me in the shin. I'll twist his head off—" As Zella took a threatening step, the boy, still

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howling, ran around the corner of the nearest cabin.

Grogan felt his bruises and slapped the dust from his suit as Zella and Frybush burst into apologies. "Never mind," he said, "it gave me an idea. Professor, can these . . . can our friends here leave their reservation if they wanna?"

"Surely, if they're not known to be dangerous. They're not citizens, but wards of the government with certain guaranteed rights. Some have traveled widely, though they always come back."

"Why?"

"For one thing, to be among their own kind."

"Yeah," said Zella, "and you just reckon what it's like for one of us to travel on one of your measly little trains, or sleep in one of those postage-stamp-sized beds. Huh! The airlines won't even carry us."

Grogan said: "Wonder if I could talk to George Ethelbert again?"

"Don't see why not," said Frybush. "We'll pass him on our way back to the gate."

When they saw Ethelbert again, still playing catch, Grogan called him over and asked: "George, how'd you like to be a professional football player?"

"Huh? What? You mean play football for money?"

"Sure. I could make you one."

George Ethelbert thought for a moment, his sloping forehead contorted. Finally: "Thanks a lot Mr. Grogan. I hope you won't get mad if I turn you down."

"Why don't you want to, huh?"

Ethelbert twisted one large bare foot in the dust. "Well, to tell the truth I don't wanna be no football player; I wanna be an artist."

"A *what?*"

"An artist. You know, a guy what draws pictures."

"Wouldn't that tie you?" exclaimed Grogan, pushing his hat back on his head in puzzlement.

"But say, lemme think a minute—You know, George, maybe we can get together on this business anyway. Lemme see . . . I know: you sign up with me to play ball, and I'll throw in a course at the Chicago Art Institute. Maybe you could get to be like Harry Whitehill, that baseball player that teaches that . . . what you call it . . . higher mathematics when he ain't playing."

"Maybe you got something there," said Ethelbert. "Give me a day to think about it. But say, how would you get me to Chicago? I can't even get into one of them railroad cars."

"Guess I'd have to hire a moving van. That gives me another idea! I'll ship you north in this truck without telling anybody, and train you secretly, and then I'll spring you in our first game of the season as a surprise! Boy, what publicity! Got some clothes, by the way? You can't run around Chi the way you are."

"Yep, I got a suit to wear into town. Had to have it made special, naturally."

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"Natch," said Grogan.

The first game was to be with the Dallas Wildcats. Ethelbert, climbing into his oversized football suit, looked forward to it with some fear and some hope. On one hand he had never faced such a large crowd of "normal" people, and was sure he'd be scared to death when he lumbered into the stadium. They would stare at him and photograph him, and if he fumbled or tripped he would face the ridicule of thousands and see his blunder recorded in print. Sometimes he wished he were back on his reservation where as assistant chief he had been important in his own right and where you didn't have to watch yourself every minute.

On the other hand, once people knew about him, he could stop this hole-in-the-corner existence. He was living in Cicero in a tent in a backyard belonging to Bill Szymczak, the quarterback, and traveling to the practice field in Grogan's closed van. Also he hoped that Grogan would stop stalling about taking him to the Art Institute; the manager would no longer have the excuse that people would find out about him. Other men of Ethelbert's race had warned him of the heartless way that shrimps tried to rook his kind when they had a chance.

Grogan made a little inspirational speech to the team, ending with: ". . . and more depends on this game than you guys got any idea of. Now, get out there and win!"

"Oh-oh," muttered Szymczak near Ethelbert. "That means the old man's in money trouble again."

"Again?" said Ethelbert uneasily.

"Sure, he's always betting his shirt and losing it or something foolish like that. Well, let's hope they don't catch up with him until after pay day."

"O.K., boys," said Day, the coach, "out we go."

The team set out through the tunnel in single file, breaking into a run as they came out into the open. Ethelbert, being saved as a surprise, was placed at the tail of the line. He did not have to break into a run, since by simply lengthening his stride he kept up with the rest.

As the team appeared on the field, their partisans in the stands set up a roar, though a feeble one compared with that at a big amateur game with its organized rooting. Normally the noise would keep on until some of the boys took their bench while others warmed up with a little snappy passing and running.

However, the minute Ethelbert lurched out of the tunnel, the roar died as if strangled. Ethelbert could see a crawling movement go through the mass of heads around the stadium as people turned to their neighbors to ask questions. He knew something of the elaborate advance publicity by which Grogan had tried to build up interest in his mysterious new halfback, and he hoped these people were not disappointed.

Ethelbert sat down on his own special little bench of four-by-six timbers and waited, feeling the thou-

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sands of eyes boring into him like needles. Then Day came over and said: "George, we're putting you in right at the start. We kick off, but we can hold 'em for first-down and then you do your act. Don't try to tackle these guys if they come through; we don't want to kill 'em. You take it easy. What's that?" The last was to Grogan, who said:

"Seems to be some kind of parlay with the referee over there. Guess they're trying to figure out a grounds for protest. Here he comes."

The referee walked over and said: "Grogan, I'd like to meet your new mystery halfback. Seems some folks have been asking whether he's eligible."

"Sure," said Grogan. "Mr. Rosso, meet George Ethelbert. See anything wrong with him?"

Rosso shrank back a little as Ethelbert put out a hand the size of a small suitcase, but braced himself and shook hands. "N-no." he said, "unless you'd call being the size of a house something wrong. There was some talk on the other team about whether you'd run in a tame gorilla on them. Speaking of which"—he shot a keen look at Ethelbert—"can your new player talk?"

"Say something to him, George," said Grogan.

"Sure I can talk," said Ethelbert. "What do you want me to say?"

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"I guess he can talk all right," said Rosso, "but I still don't altogether like it. You guys ready?"

Martin, Grogin's first-string fullback, kicked off for the Wolves. A Wildcat caught it and ran it back to the Wildcat's thirty-yard line before he was downed.

As they lined up for the next play, Ethelbert got his first good look at the Wildcats, and they at him. The sight did not seem to please them. They kept turning to stare at him when they were supposed to be listening to their captain's instructions in the huddle.

The Wildcats' first two plays were line-bucks that got nowhere. On the next the Wildcat ball-carrier got through the Wolves' line, ran towards Ethelbert—who remembering his instructions, did no more than make an ineffectual grab at him—skittered wildly around to the side, and made his ten yards.

At that, the look of blank despair on the Wildcats' faces relaxed a little. However, their next two plays were smothered line plays that got them only three yards. Then they tried a pass. Ethelbert lumbered towards the receiver, stretching out hairy-backed hands, showing his immense teeth, and going "Woo!" This sight kept the receiver so busy backing away from Ethelbert that he did not even try to catch the ball. The same thing happened on the next play. Then the Wildcats kicked, and the Wolves downed the ball on their own twenty-seven-yard line.

Szymczak told Ethelbert: "O.K., big boy, here we go." On the play Szymczak took the ball and handed it to Ethelbert, who tried to step over the scrimmage line. The mass of bodies was a little too big, however, and Ethelbert came down with a crunch on something; then continued on his way. A rash Wildcat wrapped his arms around Ethelbert's leg, but Ethelbert shook his leg and sent the player spinning twenty feet away. When another dove at him he caught the man in his free hand and threw him away. Then he trotted on down the field for a touchdown.

The stands roared; men in white carried off in a stretcher the Wildcat Ethelbert had stepped on; and the Wolves made their place-kick good. Seven to nothing, Wolves' favor.

On the Wolves' next kick-off the Wildcats were so demoralized that they fumbled the ball all over the place until a Wolf ran down and fell on it. On the first play the Wildcats actually lost ground, which completed their breakdown. They kicked.

By luck the kick came down near Ethelbert, who scooped it out of the air like an elephant catching a peanut, and lumbered down the field again. There seemed plenty of opponents in front of him, but when he braced himself to meet them they all seemed somehow to be not quite able to reach him. Over the racket from the stands he heard the Wildcats'

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captain yelling: "Grab him! Grab him!" But that, nobody seemed anxious to do. Another touchdown.

At this point, however, the game failed to go on. Ethelbert saw the Wildcats gathered around their coach, waving arms and shouting. Presently Martin told him: "They say they won't play any more. You busted that guy's leg you stepped on, George."

"Aw, gee, I'm sorry," said Ethelbert. Now Grogan was arguing with the Wildcat coach and the Wildcat manager, arms flying.

"They say they won't," yelled the Wildcat manager.

"What is this, a strike?" shouted Grogan. "Thought you had arbitration clauses in your contracts."

"How you gonna arbitrate a thing like this in the middle of a game? Unless you take out this gorilla they just don't play no more, period. And I don't blame 'em. They say they'd have to have a Brahma bull on their side to make it even."

"You mean you concede the game?"

"I don't give a care what you call it—"

Here the referee joined in: "But you can't do that! The customers'll riot if you quit now. We'll have to give 'em back their dough. You'll lose your bond—"

"And I said," yelled Grogan, "that I won't take Ethelbert out! I'm not quitting; I'm just standing on my rights."

The dispute became too general for Ethelbert to hear what was going on. With his teammates he retired to the benches and sat grinning until the knot broke up and Grogan rejoined them. "O.K., boys," he said. "Off to the showers. We get our dough without even having to play for it."

"Can I go to the Art Institute now to sign up?" Ethelbert asked him.

"Sure, sure, I'll make a date for tomorrow afternoon."

"O.K. Look Mr. Grogan, do I have to ride around inside that smelly old moving van any more? If I sort of hang out the side I can sit up with the driver, and since folks know about me now—"

"Sure, O.K., only just don't bother me now."

Ethelbert found the dressing room full of newspaper reporters and photographers. "Mr. Ethelbert, how do you get along with human beings?" "Mr. Ethelbert, will you turn your head so I can get your profile? I want to show that receding forehead—" "Say, George, how do you manage with telephone booths?"

And so on. When they asked him what he was interested in besides football, he was tempted to tell them about his art course. However, he decided that they might have fun with the story and kept his mouth shut. You had to watch yourself every minute in dealing with shrimps.

Ethelbert enjoyed his ride out to Cicero through a light drizzle in the front seat of the van, although he had to sit scrunched up with his

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knees under his chin, and the truck listed noticeably to starboard. Once when they were stuck in a jam and an impatient hack-driver began slanging Szymczak, who was driving, for getting in his way, Ethelbert unfolded his length and oozed out around the windshield to where the hackie could see him. The man subsided and sped away as soon as he could.

When they got to Szymczak's little house, Ethelbert insisted upon calling up the hospital whither the injured Wildcat had been taken, to learn that his fracture was not too serious. He even wanted to pay the wounded player a visit, but Szymczak said: "No, George, just think: if you was to walk in on him and he was to look up and see you, he'd have a galloping relapse."

"Oh, heck," grumbled Ethelbert. "All you shrimps think that because I'm bigger than you, I don't have no human feelings."

He retired to the backyard to wait for them to bring him his ten-pound dinner, wondering how much longer he'd have to put up with this tent. Although he was used to hard living, he had in his few weeks in Chicago got a yearning for the niceties of civilization. Maybe some day he could have a house built special for him with furniture to match—

Next morning he made a telephone call to Grogan's office on Szymczak's line. To do this, he stood outside Szymczak's window. Szymczak dialed the number, since Ethelbert's fingers would not fit the holes in the dial, and, when the office answered, Szymczak handed the instrument out the window.

Grogan's secretary said: "No, George, Mr. Grogan isn't in now. He was, but he rushed out to see his lawyer. I think it's about that meeting this afternoon."

"What meeting?" said Ethelbert, holding the receiver between thumb and forefinger.

"Oh, didn't you know? The executive committee of the National Football League is meeting right after lunch. It's about that game yesterday."

"Huh?" said Ethelbert, and repeated her words to Szymczak.

Szymczak whistled. "Ask her if that ain't kind of fast work."

The secretary said: "Yeah, it sure is. A couple of them flew in from California this morning. That game made headlines all over."

"Didn't he say nothing about his date with me, to go to the Art Institute today?"

"No, nothing. And just after he went out a process-server came in looking for him."

"What for?"

"How should I know? Maybe one of his wives has got on his trail again."

Szymczak, when told, looked grim. "Looks as though everything sure ganged up on him at once. He had some big debts, and now if the exec committee says no to you, it'll clean him out."

Ethelbert growled: "Why don't

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people tell me these things before I get tangled up with a guy like that? What'll he do? Run away?"

"Might. Ready to go to practice? I'll get the truck."

George Ethelbert practiced that day with only half his mind, while with the other half he worried about Grogan's course of action. In the middle of the afternoon the coach suddenly called from the sidelines: "Hey, George!"

"Yeah?" said Ethelbert, checking a pass in the act of throwing.

"Come here, please. Mr. Grogan wants to see you."

Day's tone made Ethelbert's heart sink as he lumbered off the field. When he squeezed into the dressing room he found Grogan, looking as unhappy as he, Ethelbert, felt.

"George," said Grogan, "I hate to tell you this, but the committee has decided nix."

"Huh?"

"Yeah, they passed a new rule. No more gigantanths, pithecanthropes, or other products of the Huebner experiments will be allowed to play in the League. To make sure they've added a top-weight rule: nobody over three hundred-fifty pounds."

"Gee," was all Ethelbert could say.

Day spoke up: "They can't do that in the middle of the season, Ollie."

"Maybe not, but they did. George, I'll arrange for the truck to take you back to your reservation free, if you want to go. You want to go, don't you?"

Ethelbert frowned. "How about my art course?"

"Oh, that's all off. You can't carry out your end of the contract, so you can't expect me to carry out mine, can you? I'm letting you off easy."

Ethelbert shook his great head: "I remember that contract just exactly, Mr. Grogan, and it said I was to get my course regardless of whether I was able to play or not. You remember, I insisted on that."

Grogan spread his hands. "Be reasonable, George. I'm having money-troubles of my own, and with you out of the picture I can't afford your course. Can't get blood out of turnips, you know."

"You mean," rumbled Ethelbert, "you want to get out of your promise and this is a good excuse. Why, you dirty little so-and-so, I could break your back, like this—"

"Yeek!" Grogan dodged behind the coach and fumbled in his pocket. "Don't come a step nearer! Keep back or I'll cool you!" His hand brought out a small pistol. As Ethelbert hesitated, Grogan sidled toward the door, then dashed out. Ethelbert took two steps after him, and got stuck in the door.

He pulled himself back inside the dressing room, shaking the building to its foundations, and turned upon Day. The coach paled and started to slink out the other door.

"Don't be scared of me, Mel!" roared Ethelbert. "I'm not mad at you."

"Well—"

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"I know what it is. Just because you think I'm big and ugly, I'm some kind of gorilla that goes into wild rages and bites off a guy's head. O.K., if that's how you feel. I thought you was a friend of mine."

"I'm sorry, George; I guess you did give me a turn for a moment. What are you going to do now?"

"Dunno. You know how much I eat compared to you little guys; my money won't last long at that rate. What do you do when somebody runs out on his promise?"

"Well, if it was me, I'd get a lawyer and sue."

"Don't you have to pay lawyers a lot of money ahead of time?"

"Usually yes, but some of 'em take cases on a contingent-fee basis. If they win, they take a percentage; if not, they don't get anything."

"Do you know any lawyers?"

Day closed his eyes for a few seconds. "We-ell, don't ever let Ollie know I tipped you off; after all I work for him. But if you go see Charlie MacAlpine at this address, he'll take care of you. Take your contract along."

Ethelbert went home with Szymczak as usual, and next morning persuaded the quarterback to drop him off at the lawyer's address on his way to practice.

When Ethelbert squeezed his way into the lawyer's office, the girl at MacAlpine's switchboard screamed and upset her chair. The sound brought MacAlpine from his sanctum—a stout, sleepy-looking man with a great gray mop of hair. The lawyer calmed the girl: "Now, now, this is Mr. Ethelbert, who made an appointment by telephone. Nothing to get excited about. Come into the inner office, Mr. Ethelbert, and tell me your troubles. I think you can get through this door if you turn sideways."

When Ethelbert had told his story, MacAlpine said: "Ordinarily I don't take contingent-fee cases; something of a shyster trick. But in this case I'll do it. The case would be worth the cost to me in free publicity if I never made a cent on it." He grinned through his fat and chuckled.

After they had gone over the contract and discussed ways and means, MacAlpine said: "All right, then, I'll draw up the complaint today; file it first thing tomorrow and have Grogan served."

"What'll I do meanwhile?"

"What do you mean, what'll you do?"

"I haven't got a job or anything, and I can't go on living off Bill Szymczak. And I don't think Mr. Grogan will let me use the truck any more when he learns I'm suing him."

"That's so. Look, I know a man near here I once did a favor for, and he's the manager of a hotel. I think I can get him to take you. And I'll see that you eat until the case is settled."

"Gee, I don't know how to thank you, Mr. MacAlpine." On the way out Ethelbert was tempted to ask the

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switchboard girl for a date, then thought better of it.

As Ethelbert and the lawyer walked along the street, little crowds formed to gape from a respectful distance. Ethelbert did not like it, but could not think of anything to do to stop the staring without attracting still more attention.

The manager of the Elysian Hotel did not seem over-pleased to get a thousand-pound guest and muttered something about breaking down his beds.

"That's all right," said Ethelbert; "I wouldn't know how to sleep in a bed anyhow. Just put a couple of mattresses on the floor and I'll be O.K."

"But Mr. Ethelbert," said the manager, "can I count on you not to hang around the lobby? Not that we discriminate against people of your kind, you understand, but if somebody came in after a party to register at our hotel, and looked up and saw you, he might change his mind."

"Oh, I'll stay in my room all the time, except when I'm out to see Mr. MacAlpine," said Ethelbert. "I don't know Chicago well enough to go wandering around by myself; I'd get lost."

Next morning MacAlpine telephoned Ethelbert: "Trot up to my office, George. Grogan and his lawyer are on their way."

At the office, MacAlpine told him: "They may want to settle out of court. I'll hide you in the inner office here, and no matter what happens you keep still. I'll come in and tell you what they offer."

"Mr. MacAlpine," said Ethelbert, "maybe I'm being too tough on poor Mr. Grogan—"

"Bunk! Ollie Grogan's never given a sucker an even break in his life, so don't get sorry for him."

Ethelbert waited in the inner room, hearing faint voices, until MacAlpine came in: "George, they've offered to give you two-thirds of the price of your art course if you'll call off the suit. I had quite an argument. First they insisted you weren't human, and I had to cite a dozen cases to prove otherwise. Then they wanted to offer only a quarter or a half."

"What do you think?"

"I think you'd be smart to take it. Considering Ollie's financial condition, I'm afraid that if we try to get our last pound of flesh we'll only drive him into bankruptcy. The story going round is that he lost fifty thousand to some gangster in a poker game, and this individual is beginning to bear down on him."

Ethelbert thought. "O.K., Mr. MacAlpine. What do I do now?"

"We'll see." MacAlpine led his client into the outer office, where he shook hands with Grogan and his lawyer, all bearing glassy smiles upon their faces. Grogan said: "If you'll wait until tomorrow, George, I'll pay you—"

"Why not today, Mr. Grogan?"

Grogan shrugged. "Have to get the dough—"

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"Excuse me, but don't you have one of them bank accounts? You could write a check."

"No, I don't like 'em. I keep my stuff in cash."

"Well then, I'll go with you to where you live, and you can pay me there."

MacAlpine said: "That seems reasonable to me, Mr. Grogan. After all—"

"O.K.," sighed Grogan. "You guys ready to go right now?"

MacAlpine said: "I think George can take care of the receiving end, and I've got to be in court in another hour. You go with him, George, and I'll get in touch with you."

At the street level Grogan's lawyer pleaded that he too had business, so after another round of handshakes he left them.

Ethelbert said: "Where do you live, Mr. Grogan?" And when Grogan told him: "Have you got the truck here?"

"No," said Grogan shortly.

"O.K., how far is this place? Couple of miles? We can walk it easy."

"But—"

"Come along; you show me the way." Grogan subsided and led Ethelbert zigzag across downtown Chicago on the edge of the Loop district. They reached a small apartment hotel.

"You wait out here," said Grogan.

"If you don't mind I'll wait inside," said Ethelbert. "People stare so if I stand in the street."

"All right." Grogan went into the lobby, and Ethelbert followed after, the sight of him causing the switchboard girl to swallow her gum. Grogan disappeared into the elevator, and Ethelbert waited.

He waited some more.

Finally he asked the elevator oper-

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ator: "Say, mister, you got a telephone I can call Mr. Grogan's apartment on?"

"Yeah," said the operator, approaching him in gingerly fashion. "You use this handset and push this button here."

Ethelbert pushed the button and held the receiver to his ear. He pushed it again. Nothing happened.

"You sure this is the right button?" he asked the operator.

"Yeah," said the latter, checking.

Ethelbert tried again without success, then said: "How about taking me up to Mr. Grogan's floor?"

"Uh. I don't think our elevator's made to carry so much weight."

"How many is it made to carry?"

The operator looked at the license posted inside the elevator. "Eight."

"Well, I only weigh as much as six of you shrimps, so let me in."

As Ethelbert, bending almost double, squeezed into the car, the operator protested feebly: "Hey, there ain't room for me!"

"That's all right; you can still work your little buttons. Now take me up to Mr. Grogan's floor."

Ethelbert rang the buzzer on Grogan's door, with no results. He called: "Hey, Mr. Grogan!" and knocked. Silence. Finally he drew back his fist and dealt a real wallop to the door, which flew open with a rending of wood.

The apartment showed the disorder of a hurried departure. When he had satisfied himself that Grogan was not there, Ethelbert came back to the elevator. "You got a telephone I could call outside with?"

"Sure," said the operator. "On the ground floor."

"You ain't seen Mr. Grogan come down since he went up?"

"Nope."

"Is there any other way out—a back stairs, like?"

"Nope. Just this elevator and that there stairs."

Back to earth, Ethelbert telephoned the training field and got Day. After telling of the day's happenings, he ended: "—so the guy has disappeared. What do you suppose he's doing?"

Day replied: "Sounds to me like he's absconded with all the club's money. I've been suspicious he might try something like that if it got too hot for him. You stay there and watch for him, and I'll be right over with a cop and a warrant."

Left to ponder, Ethelbert wondered whether to search the whole apartment house. No, that wouldn't do; you couldn't go busting into people's apartments unless you were a policeman or something. Besides, while he was searching thus, Grogan might sneak past him and down the stairs.

While Ethelbert lounged uneasily in the entrance to the building, a whirr of rotors above the street-noises made him look up to see a helicopter glide out of sight over the top of his own building. Instantly he knew where Grogan was. He dashed in to the elevator, nearly

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stepping on one of the tenants who was on his way out to walk his dog. The dog yipped and wound his leash around its master's legs, while Ethelbert squeezed into the elevator again and bellowed: "All the way up, you!"

"Now," he said when they had arrived at the top of the shaft, "how do you get out onto the roof?"

"Through . . . uh . . . through that little d-door there," said the operator, pointing.

The little door was open, but too small for Ethelbert, who burst out onto the roof bringing most of the door frame with him. The helicopter hovered a few feet above the surface of the roof, and Oliver Grogan was handing a suitcase up to the pilot.

"Hey!" roared Ethelbert, squinting against the gale that the rotor sent out radially.

Grogan skinned up the short ladder like a frightened monkey. The door of the craft closed behind him, and the helicopter began to rise.

Ethelbert looked around frantically for some means of stopping it. There were no loose objects on the roof. The nearest projection was the upper end of an iron standpipe.

Ethelbert seized the top of the standpipe in both hands and grunted. The pipe broke off with a sharp sound, and Ethelbert threw the two-foot length at the main rotor.

The missile hit with a clank and a splitting sound. The helicopter, with a shattered rotor-blade, teetered and crashed to the roof, crumpling its undercarriage. As it fell, the door flew open and Grogan and his suitcase popped out. The suitcase in turn burst open as it hit the roof, spilling out shirts and socks and a couple of large wads of currency held together with rubber bands. Grogan rolled over, picked himself up, and sprinted for the edge of the roof.

Ethelbert lumbered after him. At the low wall along the edge, Grogan hesitated. He looked at the pavement ten stories below, then at Ethelbert, and jumped.

Ethelbert, coming up, shot out a long arm and caught Grogan's ankle. He hauled Grogan back to the roof, muttering: "Fool, I wasn't gonna hurt you none."

"Hey," said another voice. It was the pilot of the helicopter, who had just freed himself from the wreckage. "What's the idea? What goes on? I just come to take this guy to the airport, like he 'phoned us to do—"

"Stay where you are, buddy," said Ethelbert. "This passenger of yours is a criminal embezzler or something."

"But that's no cause to bust my machine. You'll hear from the Victory Air Cab Service about this—"

They were still arguing when Day came through the door with a policeman.

Three days later George Ethelbert arrived in court to testify against Oliver Grogan in his pre-

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liminary hearing on the charge of embezzlement. Grogan, looking a little the worse for wear, was led in. While they were waiting for the judge, Grogan called over to Ethelbert: "Hey, George!"

"Yeah, Mr. Grogan?"

"Thanks for saving my life."

"Oh, shucks, that wasn't nothing."

"Sure it was. After I got to thinking I figured a guy is a sap to bump himself just on account of a little money trouble."

"Sure," said Ethelbert.

"And you won't have to testify against me after all. I'm gonna plead guilty."

"What?"

"Yeah. Been thinking. Between my ex-wives and creditors and those lugs I lost dough to gambling, I figure jail will be the safest place. Gonna go back to Oklahoma?"

"Me? No, I'm a policeman now."

"What?" cried Gogan.

"Yeah. When I told the sergeant all about how I caught you, he said that was shrewd police work, and he called in the lieutenant, and they signed me up as a rookie cop. This morning I found out I passed the civil service examination, and I start in police school tomorrow."

"I'll be—"

"So will I. Ain't it great? Next month when the new term opens at the Art Institute I'll be able to study there in my off hours. The lieutenant said when the news got out about me being on the force, that would prob'ly end crime in Chicago once and for all!"

THE END

IN TIMES TO COME

Next issue—April—leads off with "Plague," an Old Doc Methuselah yarn, and a cover by a new artist—Santry. Santry's been in the cover business for years, but he's new to Science Fiction; let me know how you like his work. Old Doc's got a nasty problem on his hands, this time, too—a shipload of plague-ridden people, outcasts driven off of every world they attempt to visit because of the strange and deadly disease that's loose aboard. You've heard of the disease, incidentally—but probably don't know how deadly it is!

Eric Frank Russell has an intriguing yarn, too; concerns a ship with a crew from Earth—but the weirdest, most confusing crew you've heard of. And even more confusing than that to the beings who tried to capture the ship!

Also, by the way, an article on the other element that was so important to the Manhattan Project—not $_{92}U^{235}$, but Oak Ridge's other prize problem child, the one that stopped German science's vaunted chemists cold—$_{9}F^{19}$, the most viciously corrosive of all elements!

THE EDITOR.

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FIREPROOF

BY HAL CLEMENT

This yarn, gentlemen, introduces a brand new idea in the field of spaceship operation. There's twenty years of discussion gone by—and this beautiful, simple, and exceedingly neat point has been totally missed! Before you reach the end, see if you can figure out the answer!

Illustrated by Orban

Hart waited a full hour after the last sounds had died away before cautiously opening the cover of his refuge. Even then he did not feel secure for some minutes, until he had made a thorough search of the storage chamber; then a smile of contempt curled his lips.

"The fools!" he muttered. "They do not examine their shipments at all. How do they expect to maintain their zone controls with such incompetents in charge?" He glanced at the analyzers in the forearm of his spacesuit, and revised his opinion a trifle—the air in the chamber was pure carbon dioxide; any man attempting to come as Hart had, but without his own air supply, would not have survived the experiment. Still, the agent felt, they should have searched.

There was, however, no real time for analyzing the actions of others. He had a job to do, and not too long in which to do it. However slack the organization of this launching station might be, there was no chance whatever of reaching any of its vital parts unchallenged; and after the first challenge, success and death would be running a frightfully close race.

He glided back to the crate which had barely contained his doubled-up body, carefully replaced and resealed the cover, and then rearranged the contents of the chamber to minimize the chance of that crate's being opened first. The containers were bulky, but nothing in the free-falling station had any weight, and the job did not take long even for a man unaccustomed to a total lack of apparent gravity. Satisfied with these precautions, Hart approached the door of the storeroom; but before opening it, he stopped to review his plan.

He must, of course, be near the outer shell of the station. Central Intelligence had been unable to obtain plans of this launcher—a fact which should have given him food

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for thought—but there was no doubt about its general design. Storage and living quarters would be just inside the surface of the sphere; then would come a level of machine shops and control systems; and at the heart, within the shielding that represented most of the station's mass, would be the "hot" section—the chambers containing the fission piles and power plants, the extractors and the remote-controlled machinery that loaded the war heads of the torpedoes which were the main reason for the station's existence.

There were many of these structures circling Earth; every nation on the globe maintained at least one, and usually several. Hart had visited one of those belonging to his own country, partly for technical familiarity and partly to accustom himself to weightlessness. He had studied its plans with care, and scientists had carefully explained to him the functions of each part, and the ways in which the launchers of the Western Alliance were likely to differ. Most important, they had described to him several ways by which such structures might be destroyed. Hart's smile was wolfish as he thought of that; these people who preferred the pleasures of personal liberty to those of efficiency would see what efficiency could do.

But this delay was not efficient. He had made his plans long before, and it was more than time to set about their execution. He must be reasonably near a store of rocket fuel; and some at least of the air in this station must contain a breathable percentage of oxygen. Without further deliberation, he opened the door and floated out into the corridor.

He did not go blindly. Tiny detectors built into the wrists of his suit reacted to the infrared radiations, the water vapor and carbon dioxide and even the breathing sounds that would herald the approach of a human being—unless he were wearing a nonmetallic suit similar to Hart's own. Apparently the personnel of the base did not normally wear these, however, for twice in the first ten minutes the saboteur was warned into shelter by the indications of the tiny instruments. In that ten minutes he covered a good deal of the outer zone.

He learned quickly that the area in which a carbon dioxide atmosphere was maintained was quite limited in extent, and probably constituted either a quarantine zone for newly arrived supplies, or a food storage area. It was surrounded by an uninterrupted corridor lined on one side with airtight doors leading into the Co_2 rooms, and on the other by flimsier portals closing off other storage spaces. Hart wondered briefly at the reason for such a vast amount of storage room; then his attention was taken by another matter. He had been about to launch himself in another long, weightless glide down the corridor in search of branch passages which might lead to the rocket fuel stores, when a tiny spot on one wall caught his eye.

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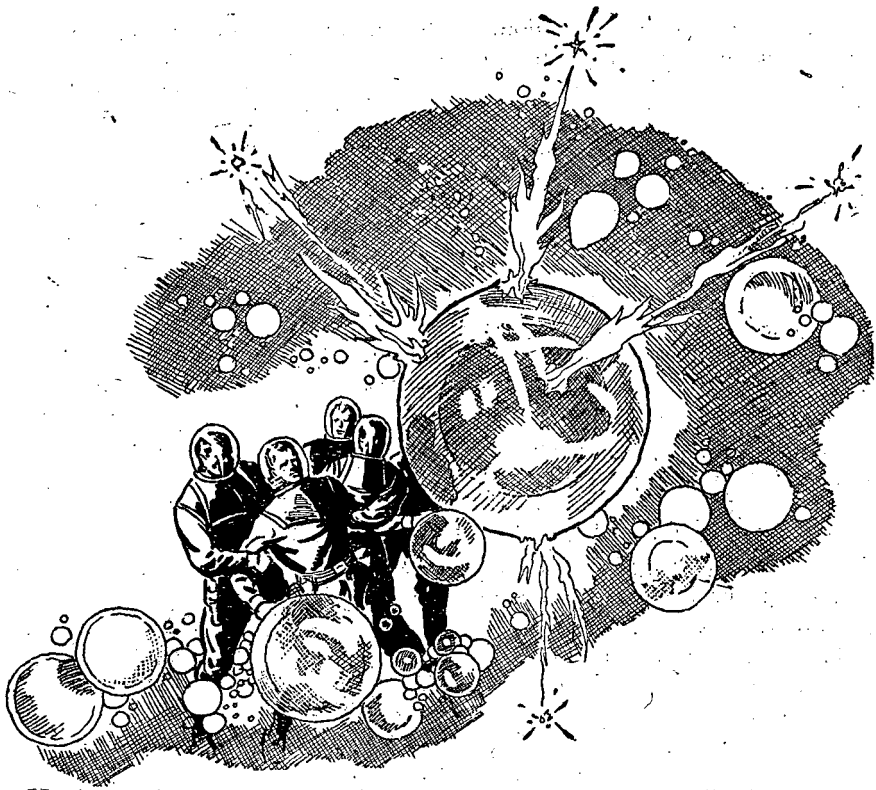

He instantly went to examine it more closely, and as quickly recognized a photoelectric eye. There appeared to be no lens, which suggested a beam-interruption unit; but the beam itself was not visible, nor could he find any projector. That meant a rather interesting and vital problem lay in avoiding the ray. He stopped to think.

In the scanning room on the second level, Dr. Bruce Mayhew chuckled aloud.

"It's wonderful what a superiority complex can do. He's stopped for the first time—didn't seem to have any doubts of his safety until he spotted that eye. The old oil about 'decadent democracies' seems to have taken deep hold somewhere, at least. He must be a military agent rather than a scientist."

Warren Floyd nodded. "Let's not pull the same boner, though," he suggested. "Scientist or not, no stupid man would have been chosen for such a job. Do you think he's carrying explosives? One man could hardly have chemicals enough to make a significant number of breaches in the outer shell."

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"He may be hoping to get into the core, to set off a war head," replied the older man, "though I don't for the life of me see how he expects to do it. There's a rocket fuel in his neighborhood, of course, but it's just n. v. for the torpedoes —harmless, as far as we're concerned."

"A fire could be quite embarrassing, even if it weren't an explosion," pointed out his assistant, particularly since the whole joint is nearly pure magnesium. I know it's sinfully expensive to transport mass away from Earth, but I wish they had built this place out of something a little less responsive to heat and oxygen."

"I should'n't worry about that," replied Mayhew. "He won't get a fire started."

Floyd glanced at the flanking screens which showed armored men keeping pace with the agent in parallel corridors, and nodded. "I suppose not—provided Ben and his crew aren't too slow closing in when we give the signal."

"You mean when *I* give the signal," returned the other man. "I have reasons for wanting him free as long as possible. The longer he's free, the lower the opinion he'll have of us; when we do take him, he'll be less ready to commit suicide, and the sudden letdown of his self-confidence will make interrogation easier."

Floyd privately hoped nothing would happen to deflate his superior's own self-confidence, but wisely said nothing; and both men watched Hart's progress almost silently for some minutes. Floyd occasionally transmitted a word or two to the action party to keep them apprised of their quarry's whereabouts, but no other sound interrupted the vigil.

Hart had finally found a corridor which branched away from the one he had been following, and he proceeded cautiously along it. He had learned the intervals at which the photocells were spotted, and now avoided them almost automatically. It did not occur to him that, while the sight of a spacesuited man in the outer corridors might not surprise an observer, the presence of such a man who failed consistently to break the beams of the photocell spotters would be bound to attract attention. The lenses of the scanners were too small and too well hidden for Hart to find easily, and he actually believed that the photocells were the only traps. With his continued ease in avoiding them, his self-confidence and contempt for the Westerners were mounting as Mayhew had foretold.

Several times he encountered air breaks—sliding bulkheads actuated by automatic pressure-controlled switches, designed to cut off any section with a bad air leak. His action at each of these was the same; from an outer pocket of his armor he would take a small wedge of steel and skillfully jam the door. It was this action which convinced

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Mayhew that the agent was not a scientist—he was displaying the skill of an experienced burglar or spy. He was apparently well supplied with the wedges, for in the hour before he found what he was seeking he jammed more than twenty of the air breaks. Mayhew and Floyd did not bother to have them cleared at the time, since no one was in the outer level without a spacesuit.

Nearly half of the outer level was thus unified when Hart reached a section of corridor bearing valve handles and hose connections instead of doors, and knew there must be liquids behind the walls. There were code indexes stenciled over the valves, which meant nothing to the spy; but he carefully manipulated one of the two handles to let a little fluid into the corridor, and sniffed at it cautiously through the gingerly cracked face plate of his helmet. He was satisfied with the results; the liquid was one of the low-volatility hydrocarbons used with liquid oxygen as a fuel to provide the moderate acceleration demanded by space launched torpedoes. They were cheap, fairly dense, and their low-vapor pressure simplified the storage problem in open-space stations.

All that Hart really knew about it was that the stuff would burn as long as there was oxygen. Well—he grinned again at the thought—there would be oxygen for a while; until the compressed, blazing combustion gases blew the heat-softened metal of the outer wall into space. After that there would be none, except perhaps in the central core, where the heavy concentration of radioactive matter made it certain there would be no one to breathe it.

At present, of course, the second level and any other intermediate ones were still sealed; but that could and would be remedied. In any case, the blast of the liberated fuel would probably take care of the relatively flimsy inner walls. He did not at the time realize that these were of magnesium, or he would have felt even more sure of the results.

He looked along the corridor. As far as the curvature of the outer shell permitted him to see, the valves projected from the wall at intervals of a few yards. Each valve had a small electric pump, designed to force air into the tank behind it to drive the liquid out by pressure, since there was no gravity. Hart did not consider this point at all; a brief test showed him that the liquid did flow when the valve was on, and that was enough for him. Hanging poised beside the first handle, he took an object from still another pocket of his spacesuit, and checked it carefully, finally clipping it to an outside belt where it could easily be reached.

At the sight of this item of apparatus, Floyd almost suffered a stroke.

"That's an incendiary bomb!" he gasped aloud. "We can't possibly take him in time to stop his setting it off—which he'll do the instant he

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sees our men! And he already has free fuel in the corridor!"

He was perfectly correct; the agent was proceeding from valve to valve in long glides, pausing at each just long enough to turn it full on and to scatter the balloonlike mass of escaping liquid with a sweep of his arm. Gobbets and droplets of the inflammable stuff sailed lazily hither and yon through the air in his wake.

Mayhew calmly lighted a cigarette, unmindful of the weird appearance of the match flame driven toward his feet by the draft from the ceiling ventilators, and declined to move otherwise. "Decidedly, no physicist," he murmured. "I suppose that's just as well—it's the military information the army likes anyway. They certainly wouldn't have risked a researcher on this sort of job, so I never really did have a chance to get anything I wanted from him."

"But what are we going to do?" Floyd was almost frantic. "There's enough available energy loose in that corridor now to blast the whole outer shell off—and gallons more coming every second. I know you've been here a lot longer than I, but unless you can tell me how you expect to keep him from lighting that stuff up, I'm getting into a suit right now!"

"If it blows, a suit won't help you," pointed out the older man.

"I know that!" almost screamed Floyd, "but what other chance is there? Why did you let him get so far?"

"There is still no danger," Mayhew said flatly, "whether you believe it or not. However, the fuel does cost money, and there'll be some work recovering it, so I don't see why he should be allowed to empty all the torpedo tanks. He's excited enough now, anyway." He turned lanquidly to the appropriate microphone and gave the word to the action squad. "Take him now. He seems to be without hand weapons, but don't count on it. He certainly has at least one incendiary bomb." As an afterthought, he reached for another switch, and made sure the ventilators in the outer level were not operating; then he relaxed again and gave his attention to the scanner that showed the agent's activity. Floyd had switched to another pickup that covered a longer section of corridor, and the watchers saw the spacesuited attackers almost as soon as did Hart himself.

The European reacted to the sight at once—too rapidly, in fact, for the shift in his attention caused him to miss his grasp on the valve handle he sought and flounder helplessly through the air until he reached the next. Once anchored, however, he acted as he had planned, ignoring with commendable self-control the four armored figures converging on him. A sharp twist turned the fuel valve full on, sending a stream of oil mushrooming into the corridor;

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his left hand flashed to his belt, seized the tiny cylinder he had snapped there, jammed its end hard against the adjacent wall, and tossed the bomb gently back down the corridor. In one-way his lack of weightless experience betrayed him; he allowed for a gravity pull that was not there. The bomb, in consequence, struck the "ceiling" a few yards from his hand, and rebounded with a popping noise and a shower of sparks. It drifted on down the corridor toward the floating globules of hydrocarbon, and the glow of the sparks was suddenly replaced by the eye-hurting radiance of thermite.

Floyd winced at the sight, and expected the attacking men to make futile plunges after the blazing thing; but though all were within reach of walls, not one swerved from his course. Hart made no effort to escape or fight; he watched the course of the drifting bomb with satisfaction, and, like Floyd, expected in the next few seconds to be engulfed in a sea of flame that would remove the most powerful of the Western torpedo stations from his country's path of conquest. Unlike Floyd, he was calm about it, even when the men seized him firmly and began removing equipment from his pockets. One unclamped and removed the face plate of his helmet; and even to that he made no resistance—just watched in triumph as his missile drifted toward the nearest globes of fuel.

It did not actually strike the first. It did not have to; while the quantity of heat radiated by burning thermite is relatively small, the temperature of the reaction is notoriously high—and the temperature six inches from the bomb was well above the flash point of the rocket fuel, comparatively non-volatile as it was. Floyd saw the flash as its surface ignited, and closed his eyes.

Mayhew gave him four or five seconds before speaking, judging that that was probably about all the suspense the younger man could stand.

"All right, ostrich," he finally said quietly. "I'm not an angel, in case you were wondering. Why not use your eyes, and the brain behind them?"

Floyd was far too disturbed to take offense at the last remark, but he did cautiously follow Mayhew's advice about looking. He found difficulty, however, in believing what his eyes and the scanner showed him.

The group of five men was unchanged, except for the expression on the captive's now visible face. All were looking down the corridor toward the point where the bomb was still burning; Lang's crew bore expressions of amusement on their faces, while Hart wore a look of utter disbelief. Floyd, seeing what he saw, shared the expression.

The bomb had by now passed close to several of the floating spheres. Each had caught fire, as Floyd had seen—for a moment only. Now each was surrounded by a spherical, nearly opaque layer of

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some grayish substance that looked like a mixture of smoke and kerosene vapor; a layer that could not have been half an inch thick, as Floyd recalled the sizes of the original spheres. None was burning; each had effectively smothered itself out, and the young observer slowly realized just how and why as the bomb at last made a direct hit on a drop of fuel fully a foot in diameter.

Like the others, the globe flamed momentarily, and went out; but this time the sphere that appeared and grew around it was lighter in color, and continued to grow for several seconds. Then there was a little, sputtering explosion, and a number of fragments of still burning thermite emerged from the surface of the sphere in several directions, traveled a few feet, and went out. All activity died down, except in the faces of Hart and Floyd.

The saboteur was utterly at a loss, and seemed likely to remain that way; but in the watch room Floyd was already kicking himself mentally for his needless worry. Mayhew, watching the expression on his assistant's face, chuckled quietly.

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"Of course you get it now," he said at last.

"I do *now,* certainly," replied Floyd. "I should have seen it earlier —I've certainly noticed you light enough cigarettes, and watched the behavior of the match flame. Apparently our friend is not yet enlightened, though," he nodded toward the screen as he spoke.

He was right; Hart was certainly not enlightened. He belonged to a service in which unpleasant surprises were neither unexpected nor unusual, but he had never in his life been so completely disorganized. The stuff looked like fuel; it smelled like fuel; it had even started to burn—but it refused to carry on with the process. Hart simply relaxed in the grip of the guards, and tried to find something in the situation to serve as an anchor for his whirling thoughts. A spaceman would have understood the situation without thinking, a high school student of reasonable intelligence could probably have worked the matter out in time; but Hart's education had been that of a spy, in a country which considered general education a waste of time. He simply did not have the background to cope with his present environment.

That, at least, was the idea Mayhew acquired after a careful questioning of the prisoner. Not much was learned about his intended mission, though there was little doubt about it under the circumstances. The presence of an alien agent aboard any of the free-floating torpedo launchers of the various national governments bore only one interpretation; and since the destruction of one such station would do little good to anyone, Mayhew at once radioed all other launchers to be on the alert for similar intruders—all others, regardless of nationality. Knowledge by Hart's superiors of his capture might prevent their acting on the assumption that he had succeeded, which would inevitably lead to some highly regrettable incidents. Mayhew's business was to prevent a war, not win one. Hart had not actually admitted the identity of his superiors, but his accent left the matter in little doubt; and since no action was intended, Mayhew did not need proof.

There remained, of course, the problem of what to do with Hart. The structure had no ready-made prison, and it was unlikely that the Western government would indulge in the gesture of a special rocket to take the man off. Personal watch would be tedious, but it was unthinkable merely to deprive a man with the training Hart must have received of his equipment, and then assume he would not have to be watched every second.

The solution, finally suggested by one of the guards, was a small storeroom in the outer shell. It had no locks, but there were welding torches in the machine shops. There was no ventilator either, but an alga tank would take care of that. After consideration, Mayhew decided

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that this was the best plan, and it was promptly put into effect.

Hart was thoroughly searched, even his clothing being replaced as a precautionary measure. He asked for his cigarettes and lighter, with a half smile, Mayhew supplied the man with some of his own, and marked those of the spy for special investigation. Hart said nothing more after that, and was incarcerated without further ceremony. Mayhew was chuckling once more as the guards disappeared with their charge.

"I hope he gets more good than I out of that lighter," he remarked. "It's a wick-type my kid sent me as a present, and the ventilator draft doesn't usually keep it going. Maybe our friend will learn something, if he fools with it long enough. He has a pint of lighter fluid to experiment with—the kid had large ideas."

"I was a little surprised—I thought for a moment you were giving him a pocket flask," laughed Floyd. "I suppose that's why you always use matches—they're easier to wave than that thing. I guess I save myself a lot of trouble not smoking at all. I suppose you have to put potassium nitrate in your cigarettes to keep 'em going when you're not pulling on them." Floyd ducked as he spoke, but Mayhew didn't throw anything. Hart, of course, was out of hearing by this time, and would not have profited from the remark in any case.

He probably, in fact, would not have paid much attention. He knew, of course, that the sciences of physics and chemistry are important; but he thought of them in connection with great laboratories and factories. The idea that knowledge of either could be of immediate use to anyone not a chemist or physicist would have been fantastic to him. While his current plans for escape were based largely on chemistry, the connection did not occur to him. The only link between those plans and Mayhew's words or actions gave the spy some grim amusement; it was the fact that he did not smoke.

The cell, when he finally reached it, was perfectly satisfactory; there were no peepholes which could serve as shot-holes, no way in which the door could be unsealed quickly—as Mayhew had said, not even a ventilator. Once he was in, Hart would not be interrupted without plenty of notice. Since the place was a storeroom, there was no reason to expect even a scanner, though, he told himself, there was no reason to assume there was none, either. He simply disregarded that possibility, and went to work the moment he heard the torch start to seal his door.

His first idea did not get far. He spent half an hour trying to make Mayhew's lighter work, without noticeable success. Each spin of the "flint" brought a satisfactory shower of sparks, and about every fourth or fifth try produced a faint "pop" and a flash of blue fire; but he was completely unable to make a flame

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last. He closed the cover at last, and for the first time made an honest effort to think. The situation had got beyond the scope of his training.

He dismissed almost at once the matter of the rocket fuel that had not been ignited by his bomb. Evidently the Westerners stored it with some inhibiting chemical, probably as a precaution more against accident than sabotage. Such a chemical would have to be easily removable, but he had no means of knowing the method, and that line of attack would have to be abandoned.

But why wouldn't the lighter fuel burn? The more he thought the matter out, the more Hart felt that Mayhew must have doctored it deliberately, as a gesture of contempt. Such an act he could easily understand; and the thought of it roused again the wolfish hate that was such a prominent part of his personality. He would show that smart Westerner! There was certainly some way!

Powerful hands, and a fingernail deliberately hardened long since to act as a passable screw-driver blade, had the lighter disassembled in the space of a few minutes. The parts were disappointingly small in number and variety; but Hart considered each at length.

The fuel, already evaporating as it was, appeared useless—he was no chemist, and had satisfied himself the stuff was incombustible. The case was of magnalium, apparently, and might be useful as a heat source if it could be lighted; its use in a cigarette lighter did not encourage pursuit of that thought. The wick might be combustible, if thoroughly dried. The flint and wheel mechanism was promising—at least one part would be hard enough to cut or wear most metals, and the spring might be decidedly useful.

Elsewhere in the room there was very little. The light was a gas tube, and, since the chamber had no opening whatever, would probably be most useful as a light. The alga tank, of course, had a minute motor and pump which forced air through its liquid, and an ingenious valve and trap system which recovered the air even in the present weightless situation; but Hart, considering the small size of the room, decided that any attempt to dismantle his only source of fresh air would have to be very much of a last resort.

After much thought, and with a grimace of distaste, he took the tiny striker of the lighter and began slowly to abrade a circular area around the latch of the door, using the inside handle for anchorage.

He did not, of course, have any expectation of final escape; he was not in the least worried about his chances of recovering his spacesuit. He expected only to get out of the cell and complete his mission; and if he succeeded, no possible armor would do him any good.

As it happened, there was a scanner in his compartment; but May-

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hew had long since grown tired of watching the spy try to ignite the lighter fuel, and had turned his attention elsewhere, so that Hart's actions were unobserved for some time. The door metal was thin and not particularly hard; and he was able without interference and with no worse trouble than severe finger cramp to work out a hole large enough to show him another obstacle—instead of welding the door frame itself, his captors had placed a rectangular steel bar across the portal and fastened it at points well to each side of the frame, out of the prisoner's reach. Hart stopped scraping as soon as he realized the extent of this barrier, and gave his mind to the new situation.

He might, conceivably, work a large enough hole through the door to pass his body without actually opening the portal; but his fingers were already stiff and cramped from the use made of the tiny striker, and it was beyond reason to expect that he would be left alone long enough to accomplish any such feat. Presumably they intended to feed him occasionally.

There was another reason for haste, as well, though he was forgetting it as his nose became accustomed to the taint in the air. The fluid, which he had permitted to escape while disassembling the lighter, was evaporating with fair speed, as it was far more volatile than the rocket fuel; and it was diffusing through the air of the little room. The alga tank removed only carbon dioxide, so that the air of the cell was acquiring an ever-greater concentration of hydrocarbon molecules. Prolonged breathing of such vapors is far from healthy, as Hart well knew; and escape from the room was literally the only way to avoid breathing the stuff.

What would eliminate a metal door—quickly? Brute force? He hadn't enough of it. Chemicals? He had none. Heat? The thought was intriguing and discouraging at the same time, after his recent experience with heat sources. Still, even if liquid fuels would not burn perhaps other things would: there was the wicking from the lighter; a little floating cloud of metal particles around the scene of his work on the magnesium door; and the striking mechanism of the lighter.

He plucked the wicking out of the air where it had been floating, and began to unravel it—without fuel, as he realized, it would need every advantage in catching the sparks of the striker.

Then he wadded as much of the metallic dust as he could collect—which was not too much—into the wick, concentrating it heavily at one end and letting it thin out toward the more completely raveled part.

Then he inspected the edges of the hole he had ground in the door, and with the striker roughened them even more on one side, so that a few more shavings of metal projected. To these he pressed the fuse, wedging it between the door and the steel bar just outside the hole, with the

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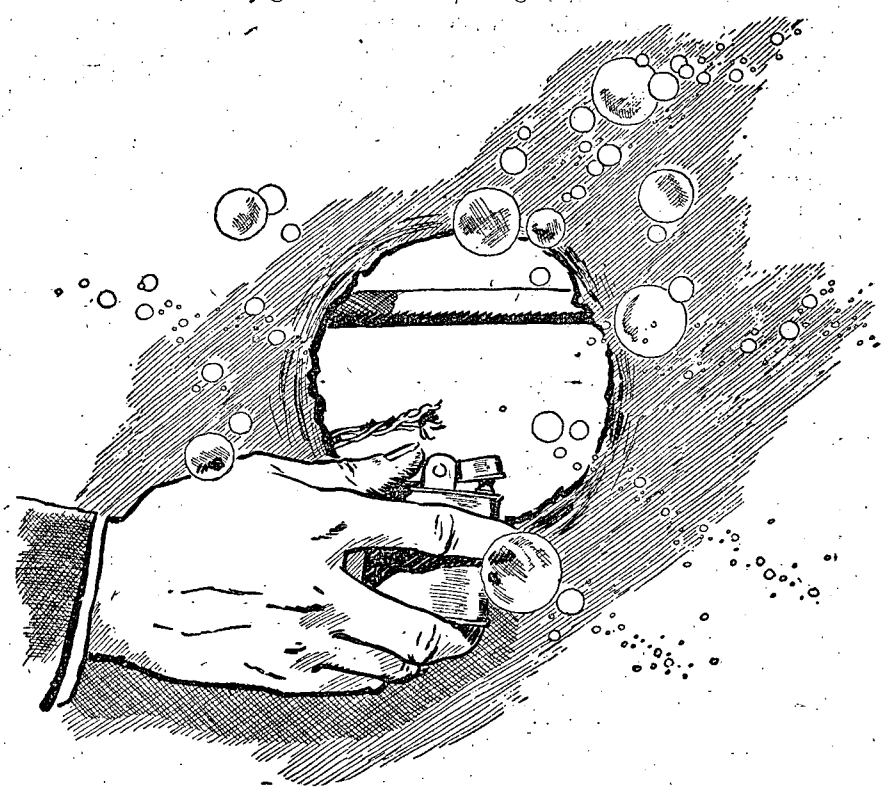
"lighting" end projecting into the room. He inspected the work carefully, nodded in satisfaction, and began to reassemble the striker mechanism.

He did not, of course, expect that the steel bar would be melted or seriously weakened by an ounce or so of magnesium, but he did hope that the thin metal of the door itself would ignite.

Hart had the spark mechanism almost ready when his attention was distracted abruptly. Since the hole had been made, a very gentle current of air had been set up in the cell by the corridor ventilators beyond—a current in the nature of an eddy which tended to carry loose objects quite close to the hole. One of the loose objects in the room was a sphere comprised of the remaining lighter fluid, which had not yet evaporated. When Hart noticed the shimmering globe, it was scarcely a foot from his fuse, and drifting steadily nearer.

To him, that sphere of liquid was death to his plan; it would not burn itself, it probably would not let anything else burn either. If it touched



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and soaked his fuse, he would have to wait until it evaporated; and there might not be time for that. He released the striker with a curse, and swung his open hand at the drop, trying to drive it to one side. He succeeded only partly. It spattered on his hand, breaking up into scores of smaller drops, some of which moved obediently away, while others just drifted, and still others vanished in vapor. None drifted far; and the gentle current had them in control almost at once, and began to bear many of them back toward the hole—and Hart's fuse.

For just a moment the saboteur hung there in agonized indecision, and then his training reasserted itself. With another curse he snatched at the striker, made sure it was ready for action, and turned to the hole in the door. It was at this moment that Mayhew chose to take another look at his captive.

As it happened, the lens of his scanner was so located that Hart's body covered the hole in the door; and since the spy's back was toward him, the watcher could not tell precisely what he was doing. The air of purposefulness about the captive was so outstanding and so impressive, however, that Mayhew was reaching for a microphone to order a direct check on the cell when Hart spun the striker wheel.

Mayhew could not, of course, see just what the man had done, but the consequences were plain enough. The saboteur's body was flung away from the door and toward the scanner lens like a rag doll kicked by a mule. An orange blossom of flame outlined him for an instant; and in practically the same instant the screen went blank as a heavy shock wave shattered its pickup lens.

Mayhew, accustomed as he was to weightless maneuvering, never in his life traveled so rapidly as he did then. Floyd and several other crewmen, who saw him on the way, tried to follow; but he outstripped them all, and when they reached the site of Hart's prison Mayhew was hanging poised outside, staring at the door.

There was no need of removing the welded bar. The thin metal of the door had been split and curled outward fantastically; an opening quite large enough for any man's body yawned in it, though there was nothing more certain than the fact that Hart had not made use of this avenue of escape. His body was still in the cell, against the far wall; and even now the relatively strong currents from the hall ventilators did not move it. Floyd had a pretty good idea of what held it there, and did not care to look closely. He might be right.

Mayhew's voice broke the prolonged silence.

"He never did figure it out."

"Just what let go, anyway?" asked Floyd.

"Well, the only combustible we know of in the cell was the lighter fluid. To blast like that, though, it must have been almost completely

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vaporized, and mixed with just the right amount of air—possible, I suppose, in a room like this. I don't understand why he let it all out, though."

"He seems to have been using pieces of the lighter," Floyd pointed out. "The loose fuel was probably just a by-product of his activities. He was even duller than I, though. It took me long enough to realize that a fire needs air to burn—and can't set up convection currents to keep itself supplied with oxygen, when there is no gravity."

"More accurately, when there is no *weight,*" interjected Mayhew. "We are well within Earth's gravity field, but in free fall. Convection currents occur because the heated gas is *lighter* per unit volume than the rest, and rises. With no weight, and no 'up' such currents are impossible."

"In any case, he must have decided we were fooling him with noncombustible liquids."

Mayhew replied slowly: "People are born and brought up in a steady gravity field, and come to take all its manifestations for granted. It's extremely hard to foresee *all* the consequences which will arise when you dispense with it. I've been here for years, practically constantly, and still get caught sometimes when I'm tired or just waking up."

"They should have sent a spaceman to do this fellow's job, I should think."

"How would he have entered the station? A man is either a spy or a spaceman—to be both would mean he was too old for action at all, I should say. Both professions demand years of rigorous training, since habits rather than knowledge are required—habits like the one of always stopping within reach of a wall or other massive object." There was a suspicion of the old chuckle in his voice as Mayhew spoke the final sentence, and it was followed by a roar of laughter from the other men. Floyd looked around, and blushed furiously.

He was, as he had suspected from the older man's humor, suspended helplessly in midair out of reach of every source of traction. Had there been anything solid around, he would probably have used it for concealment instead, anyway. He managed at last to join that laughter; but at its end he glanced once more into Hart's cell, and remarked, "If this is the worst danger that inexperience lands on my head, I don't think I'll complain. Bruce, I want to go with you on your next leave to Earth; I simply must see you in a gravity field. I bet you won't wait for the ladder when we step off the rocket—though I guess it would be more fun to see you drop a dictionary on your toe. As you implied, habits are hard to break."

THE END

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CUSTOMS DECLARATION

BY REX GRAHAM

***The** Moon-drug was remarkable—remarkably deadly! And he* had *to find out how it was being smuggled!*

Illustrated by Quackenbush

The man was hardly more than a skeleton. The clear bubble that topped his spacesuit might have been a glass case in a museum, needing only a grisly tag to indicate the head of a Terrestrian who had died of starvation. Staring, unseeing eyes burned wildly for a few seconds, then dulled like fire-blackened glass —burned and dulled. Cracked, bluish lips like those of a drowned corpse moved vaguely, soundlessly. Weaving and stumbling even where the Lunar surface lay smooth for a few paces, the death's-head figure moved feebly in the general direction of the great domed city of Luna Center. Within a quarter mile of the thick, shining walls, the man fell for the hundredth time. Or perhaps the two hundredth. He was not counting. One leg twitched convulsively in a final attempt at movement. Then the figure lay still.

Vardin tossed the official letter back to Chris with a frown. "Cutting out the 'whereases,' the 'further implementation of program's' and the rest of the mumbo-jumbo, it comes down to just what we expected," he told the girl.

Christine Christoferson nodded her head anxiously, silently hating the Central Office on Terra. "I know," she said, glaring at the letter.

When she looked back at Vardin's face, he was smiling at her wearily. "Now stop calling Central Office all those nasty names under your breath," Vardin said teasingly.

Chris blushed and thought again what a transparent face she must have. Vardin almost seemed to read her thoughts.

"This is the place where any good career-secretary should start building up possible contacts with possible successors," Vardin told her. There was a touch of bitter irony in his

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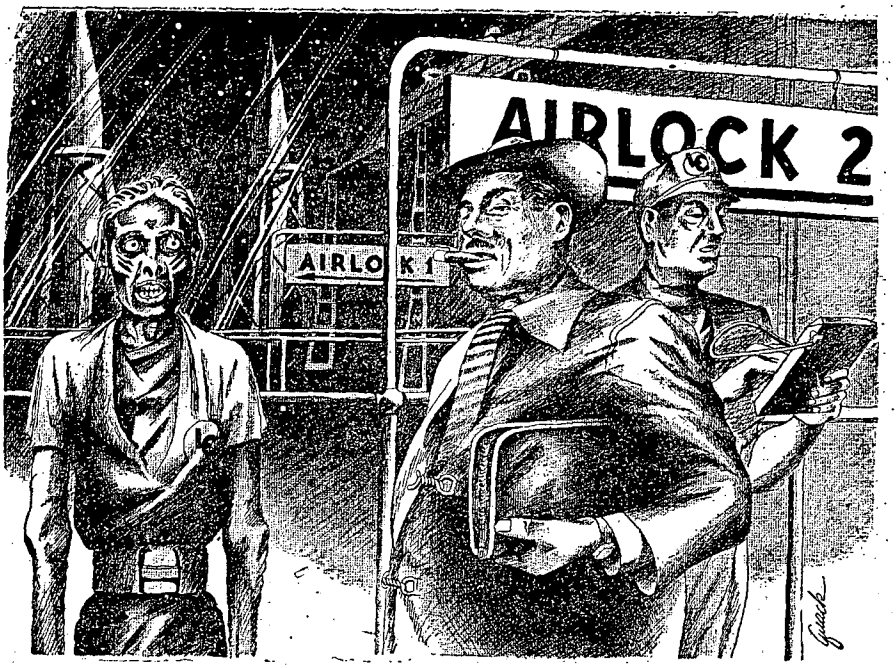

teasing. "Knowing that the head of the Lunar Customs Office is about to become the ex-head, you should protect your own position, Chris, so you won't get too badly shaken in the shake-up."

The girl's blue eyes blazed and she tossed back her mop of blond hair. Let them fire him! she thought savagely. Let them see if they can get anyone a tenth as good. Don't they ever stop to think about the wonderful record Vardin has made in the last two and a half years? "Do I look like that kind of rat?" she asked fiercely.

Vardin's tone was warm and almost tender. "Of course not, Chris. I'm kidding you. But seriously, if I do get a one-way ticket back to Terra, I'll try to see that your record isn't blackened along with mine."

"Do you think I'd stay without you?" Chris' voice dripped scorn. "Let them send out some bright career boy from Terra with all jets blazing, and see how far he gets. They can send an executive secretary with him. My three-year contract was up six months ago. I'm on optional sixty-day renewal now, and watch me pick up that option like a five-year shaker after a pinch of salt."

Vardin grimaced wryly at her figure of speech. Salt. Moon-salt. The deadly dust made from a gray-green lunar fungus, dried and pow-

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dered. And his job was to keep the stuff off every Terra-bound ship. The fabulously valuable narcotic that was getting through again, in spite of all he could do. And "shaker," the system-wide slang for a Moon-salt addict. A man who lived the life of the gods—at first. After five years, an emaciated caricature of a man, alternating between wild euphoria and dazed shaking-fits. And then, after eight or ten years, a corpse. Every time.

Take away a shaker's supply of salt, and you only hastened his death. Ten years, if he got plenty. One year, if he'd had only the first, coaxing dose. Vardin shivered a little. One dose—one pinch of Moon-salt, and you were a dead man. Sooner or later. It was trying to make it later that drove the price of Moon-salt up and up and up, till every known Terran drug was penny-candy compared to it.

Chris' anxious voice broke in on Vardin's thoughts. "It's time for the group on Flight 82," she said. "Do you want me to give them the lecture, chief?"

Vardin shook his head and sighed wearily. "Thanks, Chris, but I'll do it. Just keep your fingers crossed that I don't draw another clean miss on this batch. If I do, Central Office will cut off the 'whereas' part and start the next communiqué 'We regret to inform you—'."

Vardin stood by the battered desk in his private office, a tallish, lean figure in the neat whipcord of the Customs' Service. *Like a greyhound,* thought Chris, *with the deceptive smoothness of a racing spacecraft. If he'd only take a little more interest in her as a person, as well as an assistant—*

At the door, Vardin turned back toward her with an impish grin. "Thanks," he said dryly. And before Chris could blush for what she had been thinking, he added, "For the moral support. It helps."

Vardin strode down the narrow, dismal corridor of the "temporary" Customs Building, built fifteen years before to take the place of tents. To be replaced in three years—or when it falls down, thought Vardin. Still, it's better to be in any rattrap under the dome than working in the kind of pressurized Kawan-uts that killed so many Moon pioneers by sudden leaks and collapses before the city was built. Or living in the Luna suits that got to be as much a part of you as your skin, but never so comfortable. Glad I was never here in the really rugged old days. Prospecting was easier when you could check into the city whenever you pleased and shed the tough, patented hide that was air and heating-and-cooling system all in one. Memories of prospecting trips stirred deep in Vardin, but he thrust them down and composed his face into a neat, official smile as he came into the big room that held the Terra-bound passengers of Flight 82.

Not a crowded flight, Vardin noted—about twenty men and three women. His practiced eye sorted

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out vacationers from those who traveled to Luna on business. He nodded briefly toward one or two familiar faces. Men who made the Terra-Luna run every few months to keep in touch with holdings at both ends. Veteran space travelers. The likeliest of all to be carrying Moon-salt. But how—?

Nothing of Vardin's thoughts showed beneath the official mask. He greeted the group pleasantly and went into his speech. A brief, courteous apology for the trouble of clearing Luna Customs, an assurance that their luggage was now being processed and would be ready by the time they were. A word about Moon-salt and its dangers. The vacationers always shuddered deliciously during that part. An explanation of the search that must be made of all clothing and personal possessions. And a brief once-over of the theory and purpose of the tests that all passengers and crew members must take. Vardin's face hardened toward the end of his set speech.

"All of you, I know," he said, "are anxious to help the Terran administration, which I represent here, in the fight against smuggling. It is for your own protection, and the protection of your families that we must ask you to undergo these tests. They are as brief as they can be made, consistent with thoroughness. The stewardess will bring each of you to the testing room alone—in alphabetical order. We are sorry for the delay this entails, and we appreciate your co-operation. Thank you."

He turned and left the assembly room, hearing the pleasant voice of the stewardess behind him say, "Mr. Burton? Will you follow me, please, Mr. Burton." And the brisk thud of footsteps coming along behind him.

Three hours later, Vardin was back in his private office. As he closed the door wearily, Chris looked up. "Nothing in the luggage that we could find—or the clothes. How about your tests—find any?" she asked.

"Clean as space." Vardin's fatigue showed in his voice. He swung the ancient swivel chair around and gazed out the window at the street. From his ground-floor office, he had an excellent view of dull green sidewalks and dull gray streets and courts, and they looked even more depressing than usual. I wonder why grass won't grow even in Luna Center, Vardin mused. The monotonous green of the concrete walks was no substitute. I wonder whose cheering idea that color was.

With his thoughts elsewhere, he watched the motley traffic of the only habitable city on Terra's satellite. Vacationers in the bright orange runabouts of the Stardust Hotel moved like inquisitive bugs. Shoppers, the less-monied sightseeing twosomes and groups, and one spacesuited Venusian with four legs and long tail drifted by. The Venusian carried an oblong box which

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Vardin knew was filled with food. "Green cheese," it was called by Terrans. The Venusians had been puzzled, but co-operative, when they found that the smell and sight of the slimy, decaying mass that they loved turned Terrans sick at a distance of several yards. They kept their unholy rations in air-tight boxes while in Luna Center or on Terra. And they always seemed to carry one box with them.

"Do you suppose a Venusian feels naked without his box of green cheese?" Vardin asked Chris idly.

The diminutive daughter of the Vikings crossed to his side and stood looking out the window. "I've heard they have to eat a meal every two hours," she said. Then, after a little hesitation. "But if we don't find the smuggling leak pretty soon, we'll be in a worse mess than an acre of green cheese." She shuddered a little at the thought of such a revolting mass.

Vardin swung decisively back to his desk. "How right you are. Sit down and we'll go over it all again."

Chris turned to her typing desk, fished her purse from its drawer, a cigarette from the purse. Vardin had learned to stop offering her his. "I can buy my own," she said fiercely. "And I carry my own matches, too." Vardin admired the uncompromising independence, honesty, and loyalty packed into Chris' energetic entity, behind the soft lovely curves and innocent face that made her look helpless as a cuddlesome kitten at first glance.

"Item One" Vardin flicked at his long forefinger. "Moon-salt started getting through again only three months ago."

"After a clean record for more than two years," added Chris, defiance of Terra Central Office ringing indignantly in her voice.

"Don't blame Terra," Vardin said gently. "It's up to them to put someone out here who can stop it. If I can't, they've got to try for someone who can."

"And a nice muddle they'd be in now, without you." Chris was still indignant. "After the phosphorus shield ruined the shaker-detection method, salt was pouring out of here like . . . like—" Chris spluttered and plunged on without waiting for a comparison to come to mind. "Then you come along and stop it with the testing method. And now because we've run into a temporary snag, they're howling for your blood. Idiots!"

Vardin felt warmed in the steady fire of her indignation, her hot defense of him. But Terra Central didn't care about good tries. They wanted results. And the Moon-salt was going through to Earth.

Chris frowned stormily, gnawed a little at her lower lip and then burst out: "Could someone be carrying the stuff without knowing it?"

Vardin nodded slowly. "I think that's part of the answer," he said thoughtfully. "My tests are just a special application of the old Ror-

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schach association methods and what they used to call a lie-detector in the early days. I worked them up myself, for this special situation."

Chris was glancing at him curiously. She had often wanted to ask him how he happened to come along just when he was needed most. But she had never quite dared, and she had learned most of the essentials from office "feed-back" just after Vardin came to take over. Briefly, the rumor said that Terra Central Office was desperate. And rightly so.

Moon-salt began as a prospector's wild tale, a hint from grizzled wanderers about a lunar plant that could be dried, powdered, and sprinkled on meager rations to give them a magically wonderful flavor. At first, the talk was dismissed as another space-crazy rumor. Then some enterprising boarding-house keeper wheedled a few pinches from a transient guest, tried it sparingly in the sorry food that made up Lunar diets —and got fantastic results.

In a few short years, the whole truth came out—horribly. Moon-salt *would* make hardtack taste like ambrosia. More—it would make a painfully-scooped out bed in the Lunar dust seem a down mattress. Or the terrible, stark Lunar landscape seem a vision of spring meadows and gentle, clear streams. Medical science hastily coined terms to keep up with the wonders of Moon-salt: "Fixed projected hallucinations," "Extreme perceptual distortion," "Progressive euphoric delusion with undetermined correlation to stimulus."

The few score Lunar inhabitants who found and used Moon-salt cared nothing for the new labels. They only knew that the Moon was now a wonderful place—constantly filled with favorite foods, marvelous friends, beautiful scenery. They dreamily ate meteor shards with Moon-salt and died of acute indigestion, smiling. They showed amazing endurance, unbelievable energy. They didn't notice the perpetual trembling that set in after a few years. They didn't see in mirrors the thin line of bluish alien substance that began to creep out at the roots of hair and eyebrows, but only their own faces, youthful and idealized. They never knew that they turned to monstrous mixtures of Terran flesh, wasted and blotched, and light blue, fairylike mold. But they developed an acute sensitivity to the presence of Moon-salt and the fungus that was its source. So some of them worked for Lunar Customs, unknowingly, till they died in a nauseous dissolution, still smiling.

A "shaker" in the last stages before death could be trusted to find Moon-salt anywhere within a radius of ten yards, no matter how minute the quantity, no matter how thoroughly hidden. So they made ideal Customs searchers. The passengers didn't like it, of course. They filed past the bluing monstrosities with heads averted, but no smuggler carrying Moon-salt anywhere on his person ever got past one. Like a

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sunflower turning to follow the light, the "shaker" would start after the Moon-salt. Customs officials sometimes let him catch up with the smuggler, paw him a little with hardly recognizable hands, before they hauled the inhuman creature away. Customs men didn't like smugglers.

Then came the phosphorus shield. A tiny box of steel, a paper envelope, painted with phosphorus paint, seemed to kill the smell . . . radiation . . . whatever it was that reached the shakers. And so traffic in Moon-salt went up again.

Then Vardin came. Talked to hollow-eyed Customs men. Gave them a straw to grasp at—and became Chief of Lunar Customs. He sold them the idea working to find, not the salt itself, but the person who smuggled. He tested minds and intentions, not bags and pocket linings. Guilty symptoms, bravado, nonchalance were all alike to Vardin's tests. Using ink-blots and a stop watch and lists of words, he trapped smugglers with amazing certainty, wrung from them the secrets of ever-more ingenious hiding-places.

But now—somehow the tests were failing.

And Chris looked at Vardin steadily, as he considered this new approach.

"I've thought of unconscious carriers," he said, half to himself. "It's a good thought, Chris. A shrewd guess. It fits. Whoever is organizing this certainly knows that my methods depend largely on psychology, not on physical search. Though we've gone back to using shakers, plus physical search, since the salt started to get through again. But of course an unconscious carrier is as good against testing as a phosphorus shield against a shaker. But how, Chris, how? Put yourself in the smuggler's place. How would you work it?"

Chris looked at the ceiling and concentrated. "I'd have the salt, of course," she murmured.

"Naturally," Vardin gestured impatiently. "It comes in from outside all the time, in spite of searches at every entrance. We can't stop that. Our only job is to keep it from getting aboard ships to Terra."

Chris nodded absently. "I have the salt," she repeated. "I put it up in phosphorus-shielded packages. Small, of course. I hang around the terminals, waiting for Terra-bound passengers. Vardin!" She sat up suddenly. "How about getting the salt to them after they clear Customs? Between here and the ship?"

Vardin waved the thought away. "Impossible," he said. "Nothing goes through that exit door but passengers, crews, and luggage. And we search every inch. You know how thoroughly."

"I guess so." Chris let go of the thought reluctantly. "Well, then, I hang around outside Customs. I slip my package into someone's pocket—"

"And when he puts his hand into

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his pocket for a handkerchief a few hours later, he finds it, rushes to the purser on the rocket and says, 'Look what I found.' It won't do, Chris."

"All right," her voice was stubborn. "Then I do it up some fancy way. False bottoms in lipstick cases. Wads of gum on shoes. Any of the old tricks they used to use."

Vardin nodded judiciously.

"And I have a confederate aboard the ship. Somewhere in space, he gathers up the salt and takes it out at the other end."

"Won't work." Vardin's voice was flat. "If anyone going aboard that ship had an idea like that, I'd know it. That's out."

"But Vardin," Chris sounded doubtful, "are you sure? Couldn't someone study up answers to your tests somehow? Get past some way?" Chris had never understood just how the tests worked. She only knew they worked perfectly—or used to.

"Not a chance," Vardin was grim.

"All right then. No one in space. Someone at the other end. Someone meets the passengers, gets the salt away from them—"

Vardin laughed bitterly. "By walking up and saying 'Excuse me, madam, may I have your lipstick?', or, 'Pardon me, sir, but wouldn't you like to get rid of that gum on your shoe?'"

Chris put out her cigarette with a gesture of annoyance. "All right then. *You* tell *me* how it's done."

Vardin ran his hands hopelessly through his hair. "I don't know, Chris. I just don't know. And if I don't find out soon—"

"I know." Chris tried to put comfort into her voice, but it came out flat and listless. She spoke again. "Let's go over the list of things in the luggage again," she said with an attempt at briskness. "Maybe we'll figure out something new. Something that could be slipped into a person's possessions here and taken away on Terra—all without their noticing it."

Vardin nodded without speaking. Might as well. Might as well try that as just sit here thinking . . . thinking—

They started with the list of contents of women's handbags. Mrs. Roger Carson: One compact; powder checked for Moon-salt and found clear. One lipstick—removed from case and found innocent; restored to case. One coin purse—all coins negative for hollowed-out spaces. Two stubs from the Lunar Observatory tour-and-lecture. One matching pen-and-pencil set both guaranteed to write in free space and last forever; exactly as sent out from the factory, plus ink. One crumpled handkerchief, Terran. One souvenir handkerchief with scenes from Luna Center, featuring Stardust Hotel in the center. Two paper clips. One unfinished letter to "Dear Sis", in unaddressed envelope. "She said she was going to finish it on the Terra trip and mail it at the spaceport," put in Chris. One pair

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of black gloves. One single gray glove. Four bobby pins. One address book. "Nothing in the covers," said Chris, "we tested." One nail file. One wallet with a sheaf of Terran credits, various denominations, plus identification; passport for Luna, visitors visa. One match folder, advertising Stardust Hotel, complete with most of the matches. One half pack of cigarettes. "She buys and carries her own, too I see," Vardin grinned.

Chris made a face at him.

An hour later, they looked at each other blankly, over the last sheets of minute inventory. Women's purses. Contents of men's pockets. Report on clothing worn by passengers. Report on luggage, with contents given down to the last detail. Report on crew's clothing. Report on supplies taken aboard, seals unbroken. Nothing—in great, airy chunks. Clean as space.

And yet the Moon-salt was going through. From a dozen flights like this one. Innocent people, without a smuggling thought in their heads. Innocent cargo, without a trace of Moon-salt—as nearly as the best searching methods in the whole cock-

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eyed planetary system could determine.

Abruptly Vardin stood up. He shook himself and looked down at the blond head beside him. "Come on, Chris, I'll treat you to a cup of coffee. It's half an hour past quitting time and the whole staff is gone. No doubt noticing that you're working late, and alone, with the boss. So your reputation is already hopelessly compromised. One cup of coffee can't shatter it any further."

Over coffee, in the Lunar version of a drugstore booth, Chris kept worrying at the problem like a small dog with a big bone. "How about mail?" she asked Vardin. "Why can't the salt be mailed out from here to Terra?"

"You're forgetting your elementary education, Chris," Vardin said lightly. "Every mail pouch is spectroscoped for phosphorus, after it passes a 'shaker'. Not a chance."

"I'd forgotten," said Chris. "And even *I* don't suspect the salt of being carried through sub-ether with rush messages." She laughed, then sobered and looked stubborn. "So it must be your tests," she said. "Somehow, someone is getting around them. You know as well as I do that some salt used to get past the best searches till we got the shakers. And with the phosphorus shield, when the shakers were no good, lots used to get past the searches, till your tests started. That stopped it cold, for a long time, now it's getting past again. So the test must have fallen down somewhere. It's the only possible answer."

But Vardin shook his head doggedly. "No," he said, "not the tests. They work."

Chris almost lost her temper. "But they don't," she contradicted. "Salt *does* go through. Something new has come up in the last few months. It *must* be that, because it can't be anything else. Somebody is managing to play innocent in spite of you."

"Can't be done." Vardin was equally stubborn. "No one with a thought of smuggling can help giving it away to me. No matter how hard they try. Not even if they're sound asleep or . . . or—" Suddenly he sat up straight, and Chris saw blinding inspiration freeze his face into a mask of astonishment.

Then he was on his feet, pulling Chris up after him, kissing her suddenly, oblivious of the staring waitress. "Chris, my angel," he almost yelled, "I think you've given me the answer." Then he sobered. "I'm going home and think this out," he said gravely. "You've given me a brand-new theory to chew over. See you in the morning, angel-puss."

And he was gone.

Half an hour later, Vardin lay on his bed in the darkness, smoking, and letting his mind roam—back to the beginning of the trail, when he was only twenty-four. He began again at that check-out through the air lock gate of Luna Center six years ago. His name and purpose

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were noted in the guard's big book: "Prospector, licensed. Special object of search, platinum." But it had not been platinum. Vardin named that at random, thinking vaguely: Platinum is a platitude in prospecting. He knew too well that by the next day at most, he wouldn't be able to tell platinum from prophrey. Everything would look like platinum, if he wanted it to. Moon-salt could do that for you. He licked his lips avidly.

Two weeks of the trip he remembered. Two glorious weeks that grew more delightful as he roamed farther from Luna Center, enjoying the pleasant breezes that played among the tall pines and riffled the surface of green grasses in lovely meadows. Idling as he liked each day, he pulled from his ration kit a diet of thick prime steaks, deviled eggs, fresh warm bread, juicy ripe grapes. He drank his favorite cocktails; cool, sparkling water, fragrant hot coffee; an occasional after-dinner brandy—from the same magical canteen.

Then the delightful little house in the clearing. Snug cedar shakes like his boyhood home on Terra made a background for bright, well-kept flower beds. And within—cozy rooms that seemed built just to his liking; a fireplace; cupboards stocked with his favorite fresh foods.

Yes, it had been quite a trip. And when he began to think of looking up some of his charming friends in Luna Center, he had strolled away from the welcoming house, calmly certain that it would be there waiting if he ever cared to return. He had walked, refreshed and easy, along the grass-bordered trail. Luna Center loomed in the distance after a few hours—or was it days? He looked forward eagerly to the meeting with boon companions.

There the memories ended, for a little.

The next ones were not so pleasant.

A strange distorted face bending over him. Terrible nausea. Weakness that seemed to turn his flesh and blood to putty, then to jelly, and finally to a wisp of uncertain smoke. Voices that spoke to him when he did not understand. And times when he seemed to hear voices but could see no one beside him. The horror of seeing his own hands, wasted to dry, feverish skin over bones that seemed too brittle to break through even that feeble covering. The sick realization of what lay behind those beautiful visions. Lunar desolation in place of trees; dehydrated, condensed food that changed in taste to what his fancy willed; a guess that the house with the cedar shakes must be a cracked and desolate Kawan-hut, its pressure gone, its walls barely standing.

And then, gradually, a growing and persistent wonder: Why wasn't he dead?

One hundred percent fatal—that was the record of Moon-salt. Vardin had seen enough shakers in their last stages to know what he must

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have been like, in stark reality, during those two dream weeks. Then why wasn't he dead?

Moon-salt knew no antidote, not even a palliative for its certain course of destruction. Sooner or later, you were a corpse. But Vardin wasn't a corpse.

The days during the growth of the puzzle blurred in his mind. He thought he remembered walking away from the Stardust Hotel, and the persistent flash troubled him. That haven of rich and pampered vacationers to Luna was the last place in the whole system to find a shaker in his death throes. If he had been there, how did he get there? And why?

Memories of the months that followed grew stronger. A quick-changing panorama of menial jobs. Even on Luna, someone had to wash dishes, sweep out bars, scrub the concrete courts that took the place of lawns to Luna houses and hotels. Drifting shakers did the work; hazy, unreliable, but willing to work for very little in a much-undermanned community. Looking like them, Vardin joined them, drifted with them while he fought his way back to strength. Somewhere in those months, he made the second discovery. He found out what Moon-salt had done to him instead of killing him.

He kept silent about both discoveries. He soon found that his tale of rising from the sure dead met with blank disbelief and ribald guffaws when he tried to tell it. A new shaker's delusion, his fellow victims said. Have another pinch of salt and tell us another. As for the second discovery, he told no one. No one would believe that either. And what they didn't know wouldn't hurt them. But it might help Vardin.

Gradually a purpose formed in his mind. Time enough to talk about the second discovery when he had a reason to—after he found out more about Moon-salt, about himself, about those confused memories of convalescence.

So Vardin worked his way quietly into Civil Service. Sweeping out the offices of Terran Administration buildings, filing unimportant papers for the Customs Department, helping service the big rockets on the Terra-Luna run, he shifted and persisted and worked closer to his goal. There was little time for personal research on filling in the missing memories. Leave that till he was strong and sure again, and had a job that could take him back over the trail without exciting too much comment. It was while Vardin was working in the Accounting Section of Customs that the big chance came. The phosphorus shield gave smuggling its new answer to Customs searches by the shakers.

And Vardin was ready. His impressive speech to the Customs heads was given with quiet authority, backed by demonstrations. His carefully prepared battery of tests made an imposing show, flourished in their

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faces with all the polysyllablic mystery Vardin could muster.

Like a drowning man grasping at a straw, they took to Vardin. And they found the straw a life raft.

That was two years and six months ago, and now the life raft was falling apart under them. Ironically, Vardin's amazing record for stopping Moon-dust at the source for so long a time worked against him. Lulled into a feeling of smug security by the effectiveness of Vardin's methods, Terra Central Office turned on him with double horror and wrath when the traffic started again, and crept up and up. From anxious inquiries with promise of full backing, the memos changed to nervous demands and angry threats. Quick dismissal was the next step.

Vardin came back to the problem in hand. Unconscious carriers must be part of the answer. No one who intended to smuggle Moon-salt could pass through Vardin's testing room without his knowing that intention. Of that he was as certain as if his tests had been infallible, instead of the clever window dressing he alone knew them to be.

Yet there must be more to it than that. Vardin could see no way around the problem of planting the salt on innocent carriers and retrieving it later, without help from the carriers themselves. And it must be unconscious help. "I'd know it, even if they were asleep," he had told Chris. And he added softly to himself in the darkness, "But I wouldn't know if they didn't know themselves. And one answer to that is posthypnotic suggestion."

His mind raced along the new path. Someone—somewhere—gave Moon-salt to Terran passengers while they were hypnotized. The time and place were unimportant if he could figure the method. Who and how? Never mind, fantastic or not, it was a possible lead. Hypnotized, but only about one minor thing—it could be done. Then at some given signal, back on Terra, the second part of the posthypnotic suggestion could work. The subject would feel an irresistible impulse to . . . to . . . well, leave a lipstick in a certain place and then forget all about it. Or to answer a certain question in a certain way that would reveal the hiding place to Terran operators. Fiendishly ingenious—could it work?

And if it did, how did the salt escape the regular search? An unconscious carrier was proof against Vardin's psychological probing, but Moon-salt could still be detected by shakers, unshielded. And phosphorus shields could be found by spectroscopic searching. Except that they hadn't been.

One thing at a time, thought Vardin. Check the psychological end first. Worry about the physical later. Once you crack the first, the second is easy. His face was grim in the darkness, as he reached for the bedside phone.

Twenty minutes later, Vardin smiled in satisfaction. He had checked with the Luna chief of Ter-

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ran Health Service, dragging the big bluff doctor unwilling from a game of bridge. Doc Blythe confirmed his hunch without asking embarrassing questions about a supposedly hypothetical problem. He was smarting under the ignominy of going down six spades doubled.

It's a slim hope, but worth trying. On that thought, Vardin slept.

He grinned broadly at Chris when he strode into the office the next morning. She smiled back at him, cheered by his air or purpose. "Got a lead?" she asked eagerly.

"About as thick as a cobweb," Vardin said, "but it just might lead us to some poisonous spider." He hung up his hat and sat down. "Angel-puss, prepare to answer some silly questions without asking any of your own."

Her brows arched, but she nodded instantly.

"Suppose you had a touch of the space wearies, or nightmares, or a general feeling of crack-up, what would you do?"

Chris flashed him a puzzled glance. "My stability rating is nine hundred," she said dryly. "But you said not to ask questions. Well, I'd go and look up Doc Blythe, of course, and get a dash of re-orientation."

"Right." Vardin's grin broadened even more. "And if you weren't in Civil Service, what then?"

"Why, I'd find another doctor who's good on psychosomatics," Chris said readily. "Dr. Wilson gets a lot of calls on that. You calm down just *looking* at him. And Dr. Stephens might be a good one, though I guess he doesn't take outside calls. Stardust Hotel keeps him in plenty of credits just to look after the guests, and give them orientation treatments shortly before take-off to ward off acceleration sickness."

That answer must mean something to Vardin, thought Chris, *because of the way his face lights up. I love that eager look. But where do we go from here?"*

Vardin seemed to answer the unspoken question. "We're going to call on Dr. Stephens," he said softly. "But nothing formal. Here's what I want you to do, Chris. And this is for the good of the Service, so don't tell me you're above using your feminine wiles for the purpose God intended them for."

He explained things to Chris, and if it all sounded nonsense to her, she said nothing. When he finished, Chris nodded sagely. "Give me a week," she said. "Plan for . . . let's see . . . next Endday."

Vardin looked more than ever like a greyhound in his full dress suit with conservative forest-green trousers and deep crimson jacket. He saw several men making a mental note of the combination, which stood out boldly against the season's most popular colors of sea-green jacket and gold trousers.

His progress across the ornate lobby of the Stardust Hotel was not too rapid, not too casual. He looked

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like a man coming to meet a woman —and fully expecting her to be late by half an hour. After a quick, thorough search of the lobby with his eyes, he strolled into the cocktail lounge. His idly roaming glance fell on a couple seated well back in the shadows by the wall, away from the polished dance floor. After a moment's hesitation, he threaded his way through the tiny tables toward the man and woman.

"Hello, Chris," Vardin said.

The blond girl acknowledged his greeting with a not-too-eager smile, presented her chief to Dr. Stephens. After a few moments of verbal maneuvering, the doctor invited Vardin to join them for a drink while waiting for his date. Chris secretly admired the smoothness with which Vardin had made it impossible not to extend the invitation, and yet not seemed too interested.

The conversation eddied through a few formal inanities while orders were given to a hovering waitress and drinks were brought. Then Vardin said to Stephens casually: "I envy you, doctor. A resident job at Stardust Hotel must make life on Luna almost worthwhile—not to mention all the glamorous vacationing debs that come to you for aspirin and final orientation before take-off."

The doctor shrugged. "I can't complain," he said briefly.

Vardin rambled on. "Still, you must have time on your hands occasionally—for research, if you're interested in some project of your own. Moon-salt addicts, their cause and cure, for example."

Chris saw that beneath his indifferent manner, Vardin was peculiarly tensed for the doctor's reply.

Stephens seemed to measure Vardin with his eyes before answering. "I did some research with rats at first," he said coldly. "But I've given it up. There is no cure," he added with finality.

A ghost of a smile flickered over Vardin's lips as Chris watched him from the corner of her eye. He answered lightly: "Yes, I know. Just a manner of speaking." He sipped his drink thoughtfully. "I suppose it would cause quite a flurry if a shaker ever recovered." Again his eyes seemed to burn into the doctor's.

"Of course," Stephens shrugged. "But I never expect to see it happen." Suddenly he seemed to carry the attack to Vardin. "From what your charming assistant has been telling me," he said thinly, "your office would gladly settle for some way to keep the Moon-salt on Luna, and leave the medical profession to struggle with the unfortunate victims."

Vardin continued to stare at the doctor for a full ten seconds without replying. Then he said softly: "That's true. We're badly stumped right now." He dismissed the subject with a shrug. "Let's forget about Moon-salt," he said lightly. "Chris and I worry about it all day. If she weren't so good tempered, she'd hate me for dragging the sub-

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ject after her out of office hours." He flashed a warm smile at Chris, and spoke teasingly. "You haven't been inflicting our woes on your escort, have you? Better get him to talk instead. Maybe you can wheedle some free advice out of him about re-orientation for chronic worriers. He might even give you a light hypnosis-relaxation treatment free."

Vardin's eyes swung back to the doctor. But Stephens was looking at Chris. "I'd say the young lady's stability rating is second only to her charm," he said gallantly. "Would you like to dance this one?" he asked, pointedly ignoring Vardin.

The Customs chief rose hurriedly. "Forgive me . . . I didn't mean to intrude on a twosome," he said suavely. "Thanks for the drink, Stephens. See you in the morning, Chris."

He was gone with their polite murmurs.

Dr. Stephens was not in his best mood the next morning. In the ten o'clock lull after his few morning visits, with the nurse gone on errands of his own devising, he decided the evening before couldn't be called an unmarred success. The girl Chris was charming—but elusive. Not nearly so much impressed with his glamorous position as the vacationing women of Stardust Hotel. Apparently efficient, but frightfully vague about her work at Customs. He hadn't picked up a thing he didn't know before—or

easily guess. And that fool Vardin snooping around. Fortunately, he didn't mean anything by his chatter, even though it came close to—

His train of thought broke off sharply at a knock on the door. He opened to see Vardin, thin-lipped, and Chief Winters of Luna Center police.

"Yes?" the doctor's voice was cold, cautious.

Vardin strode in without an invitation, the chief following tentatively in his wake.

"It's all up, Stephens," he said. "The chief is going to search. And don't begin to stand on your dignity and ask about authority to intrude. He has it, and I've persuaded him to use it." Chief Winters made a

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half motion toward an inside breast pocket, and Stephens guessed at a warrant.

Vardin kept his gaze on the doctor. "What you want, chief, is in the . . . upper . . . right hand . . . drawer of the . . . filing cabinet." Vardin spoke slowly, concentrating. "There's a false back . . . works by spring."

Facing Vardin, unmoving, the doctor began to sweat. Following Vardin's minute directions, the chief went looking. A rattle of papers told Vardin that he'd found what he wanted. He heard the chief whistle. "It's here all right, Mr. Vardin," he said, mingling astonishment and relief in his tone. "Just like you said. Notes on the process for working Moon-salt and phosphorus both into the actual texture of paper."

Vardin nodded but continued to stare at the doctor. "That's enough to hang him, but I think he may sign a statement giving us the details of the whole operation. It will include his method of adding a little something of his own to the orientation treatments for outbound passengers—a simple suggestion to write a long newsy paper provided by the good doctor. And to address it—but not to the person to whom the letter is written—at the spaceport on Terra; mail it and then forget the whole thing, under posthypnotic suggestion. Even if he doesn't make a statement, we'll catch the letter that went out on Flight 82, with luck."

Stephens muttered a curse under his breath.

Vardin suddenly spoke again. "He'll sign," he said decisively. "He's hoping to trade his life in return for revealing the antidote to Moon-salt."

Pure hatred flamed in Stephen's eyes. "How did you know—" he began.

But Vardin turned away. He was trembling slightly. "Take over, will you, chief? I'm due back at my office."

As Vardin strode down the hall of the Stardust Hotel, he heard the chief's rumbling bass saying: ". . . and I never miss with it. So just sit down and be quiet while I 'vise for a few of my boys to come and take care of details."

By ten-thirty, Chris was beginning on the fourth fingernail. She had examined what she could remember of the talk between Vardin and Stephens frontward, sidewise, and upside down and nothing meant anything special. Yet she could swear that Vardin was satisfied when he left. Now he was late at the office and getting later by the minute—and he hadn't phoned. How did he figure Dr. Stephens to be tied up with the smuggling—if at all? And what was he—

Familiar footsteps in the corridor brought Chris breathless to the door. "Vardin," she cried, "where in the world—or on Luna—have you been?"

"Easy, angel-puss," Vardin's face was tired but he was smiling as he came in and shut the door. "Take

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a fast extra-urgent, top-secret flash to Central Office on Terra."

"But Vardin, what in space and time—"

"Business first," he grinned at her. "You'll catch on as we go along. Address this to old Yates himself at Central Office, Terra, and all that blah. Then say: 'Clear all passengers Flight 82 automatically, except Mrs. Whatsername Carson. Tag her closely and pick up envelope she will address at Spaceport before she mails it. Letter is vital evidence to clinch case against smuggling combine. Note address on envelope, pick up addressee by any and all means. Don't hold Carson woman, she is innocent carrier under post-hypnotic suggestion. Salt is actually imbedded in letter paper with phosphorus combined to make shield—' "

Chris' flying pencil jerked to a stop. "But why didn't the phosphorus show under spectograph search of her purse?"

Vardin grinned even wider. "It did—and we passed it as reaction from matches from the Stardust Hotel. Chris, this was the most foolproof scheme ever devised in the history of—hey, finish this memo first. Ready? Say: 'Stephens, resident M. D., Stardust Hotel, originator of scheme. Get Terran receiver and we have total brains of the ring. Preserve utmost secrecy throughout. Details follow.' And sign it: 'Vardin.' Get that out half an hour ago, angel, and then I'll fill in the sketch."

As her fingers flew over the code of the top secret message, Chris could only think of one question. The method was plain now that Vardin had outlined it—but how did he find it out? For twenty minutes, the only sound in the office was of racing typewriter keys. Then Chris dispatched the memo with a waiting messenger and turned to Vardin.

"How did you know? Just tell me that, before I go out of my mind."

Vardin leaned back in his chair, and looked at her quizzically. "It's a long story," he said, "and I'm afraid there's some of it you won't like. But I want you to know it all, Chris. It starts six years ago when I was a Luna prospector myself. I was on Moon-salt. A five-year shaker, and nearly ready for final coma. I went out on one last prospecting jaunt—

"I finally got back the lost memories, at least the part that counted, straight from headquarters. From an eyewitness, you might say—Stephens. He gathered me in, in a manner of speaking, along with two other shakers who had dragged me the last little way to Luna Center with them. They were under the impression that I was helping out their sprightly conversation, and was a long-lost friend."

Chris shuddered at the grisly picture of two insane figures, dragging along what was, to all intents and purpose, a corpse—and deep in a delusion of health and merriment.

"Stephens used to hang around entry gates looking for shakers,"

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Vardin went on. "Of course no one cared if he 'claimed' them, and he could use them—for experiments. He was working on Moon-salt long before that, keeping one jump ahead of Customs all the time. He was the one who invented the phosphorus shield.

"God knows what he had in mind for me, when he got me. But he took me off to his lab—private quarters in the basement of Stardust Hotel. And there I gave him something to really think about, because my symptoms were different from any he'd ever seen. I didn't die. I got well."

Chris' whole face was a question.

Vardin nodded. "That's what I've been wondering for years," he said. "And now I know. And Stephens knows. He's known all the time—for six years. He found the stuff, and its smell—on my hands and in the contents of my stomach. You see, Chris, I never knew what I'd eaten in that broken down prospector's shack. Of course, it looked and tasted like steak and mushrooms and Lord knows what to me. Actually"—he grimaced and swallowed sharply—"it was Venusian green cheese."

Chris gasped. "And that . . . that . . . stuff kept you from dying like the rest of the shakers?"

Vardin nodded. "It's a Venusian fungus. Half-rotted, of course, when they eat it. But it killed the Moon fungus. Some Venusian prospector must have left a supply there to come back to after a trip. And I"—he looked sick again—"ate it." He hurried on. "Stephens meant to keep me around a while to watch developments as a couple of alien molds fought over my body, but I came to a little faster than he expected and wandered away one fine night. He hadn't bothered to lock me in much."

A thought struck Chris. "But . . . but if Stephens has known the antidote for Moon-salt all this time, why didn't he—Oh!" Her face was horrified.

Vardin nodded grimly. "Exactly. Why should he cut down chances of selling Moon-salt at fabulous sums? Let the shakers die."

Chris stared at him. "How horrible," she whispered. There was a moment's silence, then she asked, "But Vardin, I still don't know how you caught on. Have you been trailing Stephens secretly for months, or something?"

Vardin looked at her and shifted uncomfortably in his chair. "This is the part that's hard to tell you, Chris. No—I never saw Stephens again between that time and the other night when I sent you out with him. But you'd given me the idea of unconscious carriers, and that led to the thought of hypnosis, and that led to doctors. Stephens was in the best position to keep in contact with a steady stream of voyagers to Terra. So I started with him. And while you held him still with a vision of blond loveliness . . . I . . . talked to him. The way I talk to outgoing passengers in the testing room."

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"Yes, but—" Chris was bewildered. "But you didn't give *him* any tests. You didn't say anything, really. I was watching. You seemed to be concentrating awfully hard, but you didn't say anything important and neither did he. So how did you—?"

Vardin waved a hand defensively. "That's what I couldn't tell anyone till now. And it's got to be kept a secret between us two, Chris. You see, the Moon-salt didn't kill me, but it did affect my mind. When I asked Stephens questions and made conversation all around smuggling and hypnosis and so on, he didn't say anything important—but he *thought*. And I . . . well, now . . . don't be mad, Chris . . . but, I'm a telepath!"

It took a few seconds for the idea to register. Then Chris' petal-pale skin turned scarlet. "You . . . you . . . and I've been . . . and you—" She rushed for the office door.

But Vardin was ahead of her. "Chris," he said desperately, "that question you've wanted me to ask—I'm asking it. Please. And I can't read thoughts without a terrible strain unless they're pretty plain. And you could get used to it . . . and—" He dropped his hand from her shoulders and turned away.

Then he turned back. Chris was smiling. "You mean—?" Vardin's face lit with joy.

"Read it for yourself, Vardin," Chris said softly. "I'm thinking it."

THE END

THE ANALYTICAL LABORATORY

Most unusual—most unusual indeed. This time we have a short lab to begin with; due to the length of "Players of Ā" only four stories appeared—and then two of those tied for second place! Cramped for room this month, so we'll just present the score:

December, 1948 Issue

Place	Story	Author	Points
1.	Players of Ā (Pt. III)	A. E. van Vogt	1.94
2.	Tied:		
	Genius	Poul Anderson	2.22
	Late Night Final	Eric Frank Russell	2.22
3.	Bureau of Slick Tricks	H. B. Fyfe	3.36

THE EDITOR.

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THE CASE OF THE MISSING OCTANE

BY ARTHUR DUGAN

***Betcha** never knew that 65 plus 65 gives an average of anywhere from 40 to 90, depending on conditions! It does in gasoline—and it does other tricks, too. As explained by a petroleum chemist. For the Doubting Thomas Division: this is straight, strict fact article material!*

Cartoons by Cartier

August 12, 1947

Snafu Oil Company
Snafu Bldg.
Largesitee, Newvannia

Gentlemen:

I have a good service station and more steady customers than transients, and heve been selling your products exclusively since I got out of the Army. Once in a while some customer will ask me questions about the gasoline I handle and when they're questions I can't answer it makes me feel stupid. Right now I'm stumped because of what happened to Mr. Frank's car, and since it's your gasoline that's under attack I think it's up to you to supply the answers. This is what happened:

The other morning Elmer Frank came in with his new car which he loves more than he loves his wife. He squinted very carefully at the gas gauge and "I think it will take about five gallons," he said, "Premium grade," he added.

So I put in five gallons of the high-test, checked his oil, water, tires and battery and washed his windshield and rear window—all the things a good service station man will do for two to three cents a gallon gross profit—and sent him on his way, another satisfied customer. But he didn't stay satisfied long.

He was back in an hour, stopped his dream car in front of the office, and, although he saw me coming out to take care of him, honked his horn loudly. I guessed he was mad when he did that and I was right.

"Your gas stinks," he told me loudly. "Listen to that motor." I

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listened and, sure enough, heard a barely audible knock that only a crank would have noticed. "That knock wasn't there before you put in that five gallons of *Premium!*" There was something about the way he said the word *Premium* and the look he gave me that—well, anyway, I felt I had to say something, so:

"If your car knocks on Snafu Premium, it will knock on anything," I told him firmly. "Don't blame the gas. Let me try adjusting the motor for you," I offered.

He flared up at that. "Look here! Don't knock my car when it knocks!" He was sputtering. "It knocks because of your gas. I had ten gallons of Foulstinc regular gas in my tank when I drove in here and it wasn't knocking then." He shuddered visibly. "Good thing I had Foulstinc in the tank to dilute your stuff or the knock might have taken the head clear off the motor. NO! I won't let you adjust my motor, and I've bought my last drop of gas from you besides!" And he drove off.

In the last two days Elmer Frank has been talking to his friends, many

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of whom are my steady customers, and I've been hearing certain questions pretty regularly: (1) Is Foulstinc regular better than Snafu Premium? (2) Why did Elmer's car knock after Snafu Premium had been added when it had purred like a kitten before? (3) Aren't all gasolines pretty much the same?"

Elmer Frank can cost me a lot of trade. You folks have got to help me. I push your products, but I'm going to need answers fast. Please reply immediately.

Yours very truly,

Edward Dollar
318 Skylark Blvd.
Largesitee, Newvannia

August 15, 1947

Edward Dollar
318 Skylark Blvd.
Largesitee, Newvannia

Dear Mr. Dollar:

Your letter of the 12th with respect to knocking in Mr. Frank's car, apparently caused by our Premium grade of gasoline, has been referred to the writer for handling.

There is no reason for you to be apologetic about your inability to explain what probably happened. More experienced people than you frequently don't appreciate what's going on under the hood of a car, and even fewer understand what takes place in a gas tank. Your offer to Mr. Frank to adjust his motor was very much to the point and he should have thanked you.

What caused the unpleasantness was the fact that neither you nor Mr. Frank appreciated the significance of blending octane number. In this letter I want to give you the basic principles of blending. Unfortunately, what might be termed the post-graduate course in blending is highly technical and most of the modern techniques are still on the RESTRICTED list as far as general publication is concerned for reasons of National Security. On the other hand, few if any of your customers would be particularly interested in them, and I feel fundamentals herein presented will be sufficient for your purpose.

It is a natural assumption that the octane rating of a gasoline blend will bear a straight line relationship between volume percent of the octane rating of the component stocks. For example, when Mr. Elmer Frank had ten gallons of 74 octane Foulstinc in his tank and five gallons of our 81 octane Premium fuel were added, it would be natural to assume that the finished blend would have an octane rating lying between 74 and 81, the actual octane number being arrived at in the following manner:

$$\begin{aligned} 10 \times 74 &= 740 \\ 5 \times 81 &= 405 \\ \hline 15 \times\ ? &= 1145 \end{aligned}$$

Blended Octane Number =
$1145/15 = 76.3$

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Alas! 'Tain't quite so easy. Surprising as it may seem, the blended octane rating of the fuel could lie over a much wider range of values. It would be below 74 octane—which it apparently was—or above 81—which unfortunately it was not.

This effect is produced mainly by failing to distinguish between road rating values on the one hand and ASTM Research and Motor Methods of octane determination on the other. Of these, more later. As an example of the peculiar behavior of different stocks in blends you might consider a blend of "poly gas" and Straight Run Naphtha. "Poly gas" is debutanized stock from the polymerization unit of a refinery, it has a Reid vapor pressure of around 7.5. (I can't help that last sentence, Mr. Dollar—refining operations are complex. Just tuck the phrase away some place and bring it out only when your adversary is glassy-eyed. It's a sure K. O.) Straight-Run Naphtha is the overhead product of simple distillation of suitable crude oil; we can pin it down by saying its that fraction that boils between 140°F and 375°F. Octane rating of each component separately is about 82, and 35 respectively. But blend the two and surprising things happen. The "poly gas" acts as though it had an octane rating of 100 or better and improves the unleaded rating of the blend out of all proportion to what you would expect. Incidentally, "poly gas" is never sold as a fuel, its value is in its remarkable properties as a blending agent.

I'm afraid I'll have to go into a little theory, very elementary, of organic chemistry, so that you can see the physical basis of octane rating.

Fortunately in some respects, at least, the world in general has become very atom conscious since August of 1945 and the difference between atoms and molecules is pretty generally understood. For our purposes we can adopt the very general distinction that is stated as follows: The atom is the smallest unit of matter that can enter into chemical reactions, whereas the molecule is the smallest unit of matter that can have independent existence. Like all generalizations, the above is something less than exact; however, since the molecules in petroleum consist almost exclusively of hydrogen and carbon only, the above definition can easily be made to fit any case which we shall be forced to consider.

You're familiar, of course, with the so-called noble gases, helium and neon, which are absolutely inert, refusing to enter into chemical reactions. These gases are also monatomic, which by our definition means that one atom of helium—or neon—constitutes one molecule. Now the peculiar physical characteristic that distinguishes noble gases from the active elements is the number of electrons in the outer orbit from the nucleus. Helium consists of a nucleus about which revolve two

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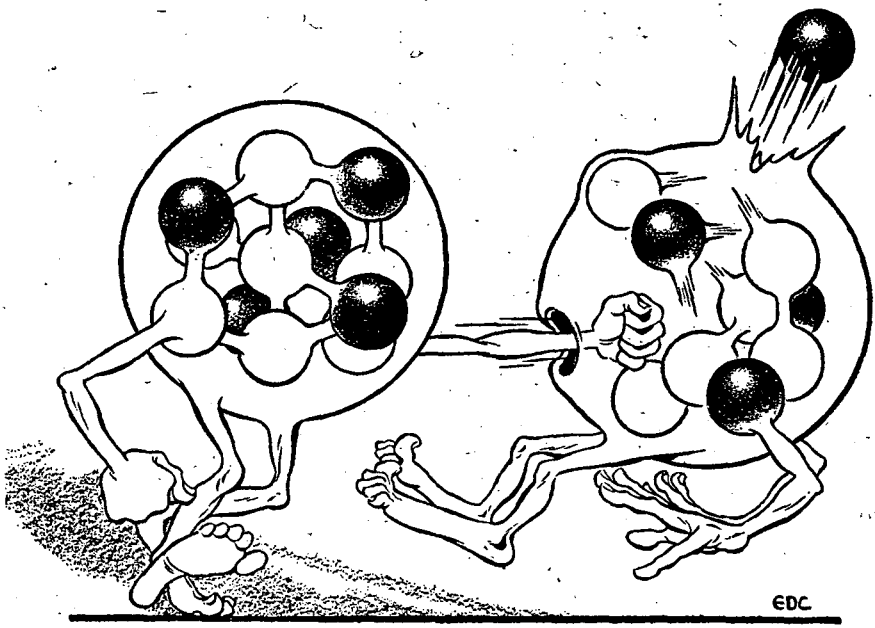
electrons in what is designated as the K ring. Helium, therefore, differs from hydrogen in that hydrogen has but one electron. Hydrogen is active because it requires one electron to achieve the same configuration of helium. Neon, inert, has two electrons in the K ring and eight electrons in the L ring. Carbon has two electrons in the K ring but only four in the L ring. Carbon, accordingly, requires four additional electrons to attain a structure resembling neon, and these it acquires by sharing in chemical reactions. In a general way all chemical reactions are manifestations of the tendency of atoms to achieve orbital configurations resembling the stable arrangements of the noble gases.

Considered in this manner the concept of valence becomes easy to grasp. For our purposes it becomes equal to the combining ratio of the elements as measured by their need to share or exchange electrons to arrive at a stable arrangement. Hydrogen always has a valence of one; carbon always has a valence of four. Four atoms of hydrogen will combine with one atom of carbon; one atom of carbon, because of its willingness to donate or accept four electrons will combine with four hydrogen, or three hydrogen and another carbon, or two hydrogen and two carbon, or two hydrogen and one carbon, or one hydrogen and one, two or three carbon atoms, or even from other carbon atoms.



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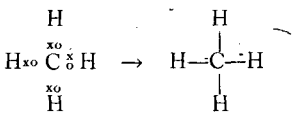
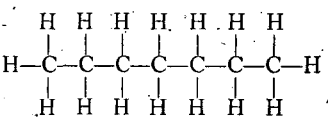
You might find it interesting to set up graphically these different possibilities using one straight line for each pair of shared electrons. I'll start you off on the first case mentioned:



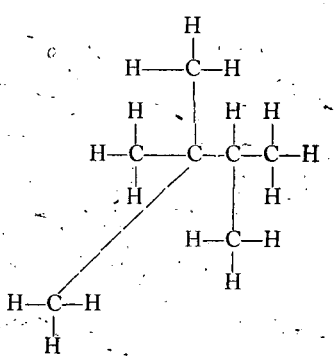
You will find that in some cases carbon to carbon linkage is accomplished by one line, in another case by two lines—which linkage is called a double bond—and a third case in which a triple bond—three lines—is necessary, is also present. As you draw up the possibilities you will be familiarizing yourself with the concept of catenation, or chain-forming tendency of carbon atoms, which is a concept it is well to bear in mind.

I would be doing you an injustice if I left you with the idea that the above is the only type of valence; opposed to the co-valence considered above, and which is the only type encountered in carbon compounds, is another type known as electro-valence which is more complicated but of no importance to our discussion of why Mr. Frank's car knocked when you put in Snafu Premium gasoline. Now, just one other concept and we'll be ready to discuss octane rating of blends. This is the phenomenon of isomerism.

Isomerism is the term used to describe the phenomenon wherein two or more compounds have identical percentage composition and molecular weight, but generally exhibit very dissimilar properties caused by the different arrangement of atoms within the molecule. Let me sketch the structure of two such isomers, heptane and triptane:



HEPTANE



TRIPTANE
(2, 2, 3, - TRIMETHYL BUTANE)

Both these compounds have seven carbon atoms and fourteen hydrogen atoms, but as Mme. Pompadour said

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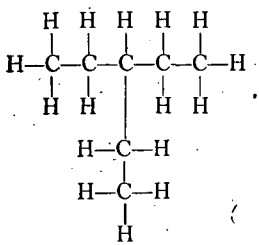
to the scullery maid, "Position makes all the difference." Heptane by definition, has zero octane rating, but triptane's blending number by research and motor methods is 112.5! Another isomer of the same basic formula is known as 3-ethylpentane with a structure like this:



3-ETHYLPENTANE

This compound has a blending octane number of 68. Isomerism, you see, is highly important in octane rating. And right here seems to be a good place to insure that we have an adequate idea of what octane rating signifies and how it is determined.

It's widely known, of course, that octane rating measures in some manner the tendency of a motor fuel to knock in an engine, and that the higher the octane number of a fuel the lower the knocking in the engine. It may not be as widely known, however, how octane rating is determined.

Before anything can be evaluated in numerical terms there are four conditions that must be met. First, there must be something to evaluate, which in our case is the motor fuel. Secondly, standard apparatus must be employed. For the evaluation of motor fuels this is the standard engine developed by the Co-operative Fuel Research Committee, a single cylinder, valve-in-head, variable compression engine having a 3½ inch bore and 4½ inch stroke, water-cooled and equipped with a three bowl variable-float-level carburetor, and the timing of which may be automatically controlled in accordance with changes in the compression ratio. Thirdly, a standard procedure must be followed. In fuel evaluation there are two methods using the above described CFR Standard Engine. The CFR Research Method specifies engine conditions of (a) engine speed of 600 rpm; (b) wide open throttle; (c) water jacket at 212°F; (d) spark advance for optimum power; (e) mixture ratio for maximum knock—pounds air per pound of fuel; (f) fuel not to be pre-heated; and (g) knock intensity to be roughly equivalent to that obtained in raising the compression ratio by one full number above the compression ratio for the first audible knock in a room where there are no other engines running. The present standard tentative American Society for Testing Materials method modifies the Research Method in three ways: (1) Engine speed increased from 600 to 900 rpm; (2) Mixing temperature set at 300°F.; (3) Spark timing advanced to the following schedule:

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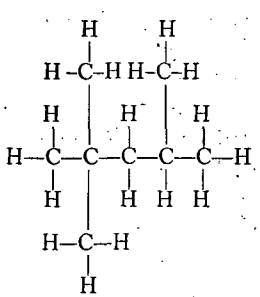
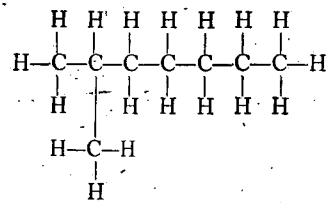
26 degrees before top center at 5.0:1
22 degrees before top center at 6.0:1
19 degrees before top center at 7.0:1

The fourth condition which must be met is that a scale against which to measure results must be provided. Octane rating of a fuel is obtained by comuparison with fuels made of known mixtures of n-heptane, which we have met above, and iso-octane itself, which has knocking characteristics so good that it has been assigned the value of 100. An 80 octane gasoline, therefore, is one whose performance in the standard engine matches that of a blend of 20 volume percent n-heptane and 80 volume percent iso-octane. Comparison is frequently made against carefully evaluated secondary reference fuels rather than the blend of the two hydrocarbons, heptane and iso-octane, which are quite expensive.

Incidentally, I'd like to let you in on a little secret: iso-octane is misnamed, it should be called 2,2,4-trimethyl pentane which looks like this:



whereas the true iso-octane has a structure like this



and has an actual octane number of 23.8. You will note that carbon and hydrogen percentages are the same in both cases. Isomerism accounts for the difference.

You have probably noticed that whenever I pictured a compact molecule, branched-chain the chemists call it, the octane number was much higher than that of its long straight-chain isomer. This difference is not one of chance, it is a rule that the more highly centralized a molecule is, the higher is its antiknock rating.

There are other classes of hydrocarbons than the paraffins we have considered up to now, and these should be mentioned briefly.

The first class is the olefins, which contain within their structure a carbon to carbon linkage of a double bond, and in consequence have two less hydrogen atoms than the corresponding paraffins, and which show greater antiknock rating than the paraffins of the same number of carbon atoms. Another class is the cyclo paraffins typified by cyclohexane and cyclopentane:

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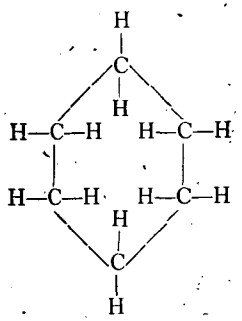
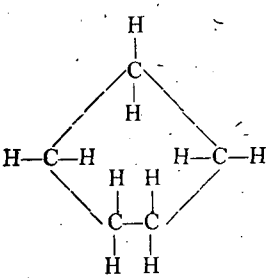


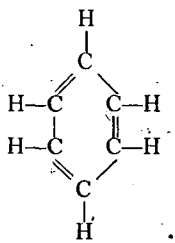
CYCLOHEXANE



CYCLOPENTANE

Obviously, you can substitute a carbon for a hydrogen on the cycloparaffin nucleus and build up a side chain. Considerable branching is possible and you might enjoy working out some of the possibilities. The effect on knock of the branching of a side-chain appears to be very large. There are also corresponding cyclic rings containing a double bond, and an ungodly number of possible isomers the octane rating of which varies according to generalized rules which I doubt are of very much interest to you.

Finally, there are the aromatic hydrocarbons which are very important and decidedly superior compounds with respect to antiknock qualities. These are based upon a six-membered ring containing three double bonds in alternate positions. Benzene, the parent of this class of compounds contains therefore six carbon atoms and six hydrogens:



The antiknock qualities of the aromatics, among compounds of a given molecular weight, differs according to the relative positions of the side-chains, again illustrating the importance of isomerism. In general, it is true that the aromatic compounds are superior to the paraffins in antiknock rating. There are some paraffinic compounds, however, equivalent in octane rating to the best of the aromatics.

Now, gasoline is a mixture of hydrocarbons of all types and will, therefore, behave somewhat differently from pure, theoretical compounds. The octane rating will differ according to molecular structures present, percentage of each type present and the density of the resultant liquid. Burned in an automobile engine there is always one best ratio of air to fuel, measured in pounds, for a given compression

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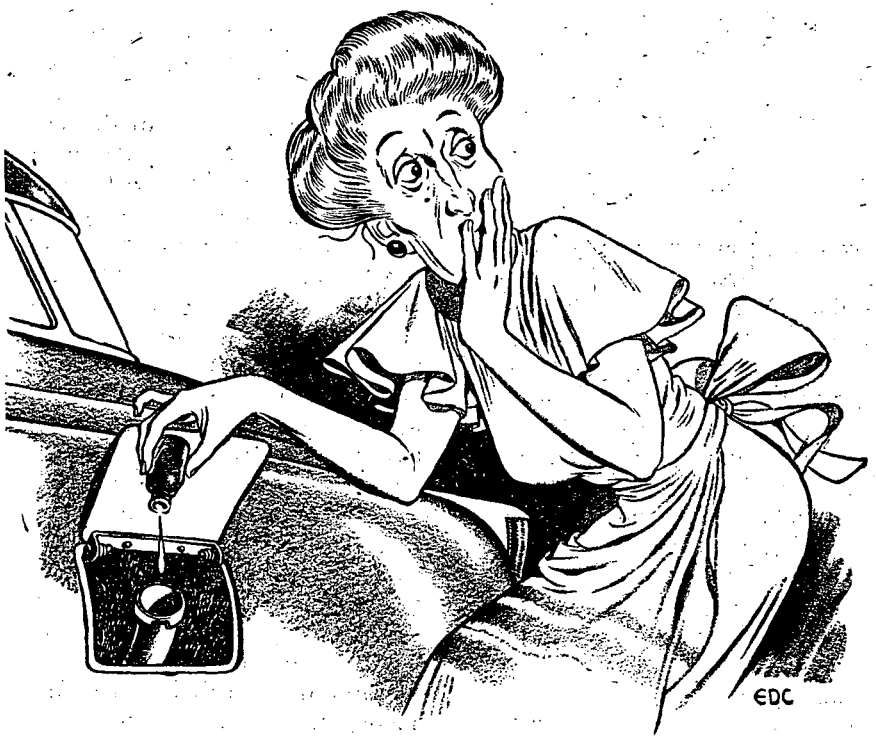
ratio, engine speed, timing, jacket temperature, throttle opening, et cetera. It was in an attempt to correlate octane rating obtained from the CFR engine with that obtained in actual operation that the ASTM modifications to the research method were introduced. Road tests indicate that the effective octane rating of a gasoline can vary as much as six units, depending upon the engine speed.

Another factor to be considered is the lead susceptibility of the fuel. Lead in the form of tetraethyl lead acts as a negative catalyst in the suppression of knock, but not all gasolines are improved to the same degree by identical amounts of lead. The rise in octane number produced by the addition of a fixed proportion of TEL is termed its "lead susceptibility." Lead susceptibility is influenced greatly by the hydrocarbons present and also by small amounts of impurities which may be present. A gasoline containing small amounts of sulphur present in the form of di- and tri-sulphides will require much more TEL than a thoroughly desulphurized stock.

Now let us consider the case of Mr. Frank's new car. He had ten gallons of Foulstinc regular gaso-



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line in his gas tank. This gasoline was of a different base hydrocarbon than the five gallons of Snafu Premium grade which he added at your station. It had different lead susceptibility and was leaded accordingly. It had a different HUCR, which is the common abbreviation of Highest Useful Compression Ratio, a term which I'll explain in a moment. Its gravity differed from Snafu's. Its volatility, that is its tendency to vaporize, differed from our product. The addition of Snafu produced a blend which differed in all these respects from either Foulsting's characteristics or our own.

Under these conditions any resemblance between road rating of the fuel and test octane number may be purely coincidental.

It is certainly obvious that Mr. Frank's car was adjusted with respect to timing and mixture ratio for the lower grade fuel. Even should his tank have contained only Snafu Premium gasoline, although it would perform to his entire satisfaction and knock not at all, he would not get the full benefit in power and long mileage out of our Premium product simply because his motor was not adjusted to its use. Any car will perform better with the use of Premium gasoline, but only if the motor is properly pre-conditioned.

I mentioned the HUCR above. This is defined as the highest compression ratio at which an engine could be operated with the fuel in question without the development of knock. As an example, let me again cite heptane and triptane; the former of which has a HUCR of only 3:1, whereas the latter can be operated at a ratio of 13:1 before knock just becomes audible. Just one last example of the influence of isomerism.

If you have any further questions on the above or any other related subject, don't hesitate to write.

Very truly yours,
Snafu Oil Company
By: Al Harrington
Refining Department
Technical Service Division

August 19, 1947

Snafu Oil Company
Refining Department
Tech. Sev. Div.,
Snafu Building,
Largesitee, Newvannia
Attention: Mr. Harrington
Gentlemen:

Many thanks for your extended reply to my recent letter, giving possible explanation of the knock developed by Mr. Frank's car upon addition of Snafu Premium to Foulstinc regular. You've satisfied me but—

Mr. Frank was in the station this morning for air. He buys his gas at the next corner, but their compressor is on the blink. While Jimmie, the helper, attended to the tires, I tried to convince him he was doing Snafu a great injustice. He turned his radio up to maximum volume

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and his back to me. So I'm still out a customer. What can you do with a fellow you can't talk to?

My other customers who asked for explanations have been given the full treatment. They probably don't understand any more than I do, but they're impressed by the glib manner in which I talk about valences, isomers, debutanized stock, et cetera. Which proves the value of the motto you apparently share with a law office I once worked in: "If you can't convince them, confuse 'em."

Sincerely,
Edward Dollar

August 22, 1947

Edward Dollar
318 Skylark Building
Largesitee, Newvannia

Dear Mr. Dollar:

The last sentence of your letter of the 19th, gave me an idea. If the statement in your first letter that Mr. Frank loves his car more than his wife is correct, the setup is perfect for some legitimate knavery.

Women are jealous creatures at best, and it's more than possible that Mrs. Frank is jealous of her husband's attention to the car. If so, she might co-operate.

If your station and Foulstinc's outlet are the only two logical places for him to patronize, the question is merely how to make Mr. Frank quit Foulstinc. Obviously the answer is to make Foulstinc's gas knock. And that's where Mrs. Frank comes in.

Under separate cover, I'm sending you a small bottle of ammonia. Now, if you can persuade Mrs. Frank to put a little into the gas tank whenever Mr. Frank buys at the Foulstinc pump, your problem will be solved. His motor will knock because even a very small amount of ammonia will cause premature detonation. In other words the HUCR is lowered drastically.

And that's what you can do to a fellow who won't let you talk.

Very truly yours,

SNAFU OIL COMPANY
By Al Harrington
Refining Department
Tech. Sev. Div.

August 29, 1947

Snafu Oil Company
Refining Department
Tech. Sev. Div.
Snafu Building
Largesitee, Newvannia

Attention: Mr. Harrington

Gentlemen:

Please refer to your letter of the 22nd.

I consider your suggestion highly unethical. However, it worked and Mr. Frank is again a customer.

Sincerely,
Edward Dollar

THE END

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SEETEE SHOCK

BY WILL STEWART

***Second** of three parts. Some doubted it would work; some didn't doubt—and didn't want it. But everyone seemed determined to stop the new power plant for one reason—selfish or otherwise—or another!*

Illustrated by Orban

SYNOPSIS

Nick Jenkins, spatial engineer, was out in space on the seetee bull—a fission-powered machine designed to prospect and mine the untouchable contraterrene meteor-drift—when the photophone beacon on Freedonia went out, leaving him lost in a deadly swarm of seetee fragments.

Cosmic debris of the seetee Invader, which collided, ages ago, with the lost terrene planet Adonis, the contraterrene drift, is matter inside out, with negative nuclei and orbital positrons. Unlike charges cancel out when it touches ordinary terrene matter, releasing a thousand times the energy of atomic fission.

The power laboratory on the airless asteroid Freedonia was first established by the old asterite engineer, Jim Drake, to tame the unimaginable violence of that reaction, for useful power. Drake was bankrupt and in legal difficulties, however, when Martin Brand founded the great Seetee Corporation, to finance him.

Now a successful expert at what he calls politico-financial engineering, Brand—the uncle of Jenkins—is also a gifted spatial engineer. His first great invention was the Brand transmitter, which could broadcast unlimited free power from the seetee generator on Freedonia to all the planets.

But the mighty power plant on Freedonia is not completed—and Martin Brand's old, idealistic dream of a Fifth Freedom of power has become a pawn of interplanetary jealousies, with Brand himself turned cynical toward it by the bitterness of his early defeats.

The four major planets are waging a cautious cold war for suprem-

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acy. The vast arena of their struggle is the High Space Mandate, a political device set up after the Spatial War to rule the asteroids and referee the division of the old terrene power metals, uranium and thorium.

All the planets fear the impact of seetee power, as an overwhelming threat to the status quo. *The notion of the Fifth Freedom appears uncomfortably revolutionary. All, however, are engaged in a desperate race to turn uneasy stalemate into decisive victory with the first use of seetee weapons.*

Martin Brand had persuaded Drake to develop self-guided missiles with seetee war heads, to protect the precious installations on Freedonia from attack by any of the jealous major planets. Lazarene, an able Earth-born engineer, was in charge of the secret arsenal.

Lost when the beacon went out, Nick Jenkins groped his way out of the swarm of untouchable meteors and back to the plant on Freedonia. Landing the bull, he found all the staff of engineers except one man fallen mysteriously unconscious, and the seetee arsenal looted.

The missing man was Jean Lazarene, who has apparently betrayed the priceless secrets of Freedonia to agents of one of the intriguing rival planets. The drug ametine hydrate, developed to slow the metabolism of space-disaster victims, was used to overcome the loyal engineers. The traitor escaped in an unidentified craft, which fired a seetee

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shot at the rock to stop pursuit.

While that super-atomic explosion did little visible damage to the iron planetoid, the multibillion-electron-volt photons released caused intense secondary radiations, which reached Jenkins and all the unconscious men. Deadly radio-isotopes were also formed in the rock itself.

Jenkins carries the disabled men to the radiation specialist, Worringer, on the asteroid Obania. Worringer finds they all have suffered radiation burns of the fifth degree —which means death after eight to twelve days. Spacemen call that radiation sickness seetee shock.

Jenkins alone is offered a slender chance at life, if he will stay at the clinic for treatment. He declines —deciding to use his few remaining days of activity for a desperate effort to complete the Brand transmitter, before the unidentified enemy plunges all the planets into Spatial War.

The creative power of seetee—the Fifth Freedom—offers, he feels, the only hope of peace. The unlimited free power from Freedonia, he believes, can remove the causes of the impending conflict.

Leaving his fellow engineers deep in the coma of ametine and dying of radiation illness, Jenkins goes out to break the cruel news to their families—to Rick Drake's wife, and to Mrs. Paul Anders, the former Ann O'Banion, who is soon to have a child.

Saying nothing of his own sentence of death, Jenkins asks help from Ann's father, old Bruce O'Banion, once a prominent leader of the pioneer people of the rocks and now a Seetee employee. The sullen old asterite turns evasive, refusing any aid.

Desperately, Jenkins starts to Pallasport, aboard the rusty old tug, Good-by Jane, *which is dangerously contaminated with secondary radioactivity from the seetee blast on Freedonia. He is going to ask his uncle for the precious condulloy, with which Brand has promised to finish the transmitter.*

Part 2

VIII.

Contraterrene power could one day terraform all Pallas—that was part of the undying dream of the spatial engineers. The unbounded energy from the Brand transmitter could drive a shaft to the planetoid's heart and power a paragravity unit there. Free power could manufacture air and soil and water, cloak in green life all the riven stone of a world born dead.

But Brand's Fifth Freedom was still a dream.

Pallasport, capital city of the High Space Mandate, was a lonely crown of life on a terraformed hill. Costly fission energy drove the paragravity unit, a few kilometers deep, which held its wisp of atmosphere. All around it lay stark, airless desolation.

An hour out, Jenkins called the Pallasport tower on the tug's photo-

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phone, and got permission to land his ray-contaminated craft on the emergency field outside the town. He asked for a wire relay to Martin Brand, in the Seetee Building. A girl's voice said:

"Mr. Brand's office."

For an instant Jenkins forgot that he was going to die. Because he knew the voice—it had haunted him through two years of exile on Freedonia; it had mocked him in the murmur of his air jet all the while he was trying to forget.

He knew he couldn't be mistaken. The girl was Jane Hardin, whom he had met on the liner from Earth, and thought he loved, and lost inexplicably when she learned that he was going to work for Seetee, Inc.

"Mr. Brand's office," she was repeating briskly now. "Who is calling, please?"

Jenkins couldn't speak. Because the crisp melody of her voice was the sound of Earth and life. Sigh of wind in pines, purr of traffic in concrete canyons, drum of breaking waves on coral sand—sounds never heard in airless space. Choked with bitter sudden loneliness, he whispered at last:

"Give me Mr. Brand."

For it didn't matter who she was. He had no time to patch up old romances. Thought of Dr. Worringer's verdict stabbed him like a poisoned blade, and he tried defensively to remember something Martin Brand had told him.

It was the day he first arrived at Pallasport and his tall uncle met him on the field. Jenkins was still looking for Jane Hardin, still trying to discover why the mere mention of Seetee had chilled her against him; and he asked, hopefully, if Brand knew anything about her.

"'Course I know her, Nicky." The famous man laughed at him, genially. "And you had better watch your step."

"Who is—?"

"Never heard the name," Brand broke in, "but still I know the type. Earth women who come to the Mandate are all alike. Predators. They've all come to get their own slice of the wealth of the asteroids, and carry it back to Panama City. So forget her, Nicky. Better stick to your spatial engineering."

And Jenkins had tried to do that, reluctantly, after he failed to find the girl. But he had never been happy about it. A predator, it seemed to him, wouldn't have been quite so elusive. Now the clipped, impersonal voice of Jane Hardin recalled him to the present.

"Sorry, sir, but Mr. Brand is busy. I'm his private secretary, Hardin. Perhaps I can help you, if you'll state your name and business."

"Nick Jenkins." His voice came abrupt and harsh. "Maybe you remember."

"Nick!" She gasped his name—perhaps with pleasure; perhaps with dismay, or merely with astonishment. All he could hear, for another long second, was the amplified hiss and mutter of stray starlight. He sat

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waiting anxiously, trying to recall the color of her eyes and the way she fixed her hair. He couldn't help hoping—

No! He fought that impulse. Certain death was in him; he had no right even to dream of life and love. Neither Jane Hardin's cool charm nor the cruel riddle of her behavior was important any longer—not unless she could help him start the Brand transmitter.

"Why, Mr. Jenkins!" Her voice was aloof and quiet now, expressing only mild surprise. "I didn't know you had asked for leave from the laboratory rock—or have you? I hope there's nothing wrong."

"Please—Jane!" He tried to crush the shudder of emotion from his tone. "Let me talk to my uncle."

"I'm sorry, but he's talking on another spatial beam. He told me not to interrupt him. If there's anything that I can do—"

Jenkins caught his breath, trying to forget that he had ever seen her. He refused to wonder how she came to be employed by Seetee now when once the mere name of the firm had turned her against him.

"Maybe you can." He tried to match the casual crispness of her voice. "I'm landing in an hour, at the emergency field west of town. I need eighty tons of condulloy that Mr. Drake requisitioned for Freedonia—right away. Do you know anything about it?"

"I saw the order." He thought she sounded faintly puzzled. "I thought the metal had already been shipped."

"It hasn't."

"Then it must be ready," she assured him, "because I know your uncle has been buying condulloy, through Mr. Gast and other associates, for nearly a year. He must have bought three hundred tons."

"Good!" Jenkins grinned at the gray bulkhead with a weary relief; he should have known that Martin Brand wouldn't let Freedonia down. "Please tell my uncle—"

"Here he is," the girl broke in; and then Jenkins heard the great man's voice, bluff and hearty, deep now with a grave concern.

"Nicky—are you hurt?"

"No." He tried to lie calmly. "But I've bad news from Freedonia—"

"Careful, Nicky!" Brand interrupted hastily. "We may be overheard, and rumors can affect the market position of Seetee. I'll meet you at the emergency field."

The emergency spaceport was the farther face of a second peak, not so tall as the one beneath the town. The synthetic air was thin there, and the oblique direction of the paragravity unit—the direction that was *down*—made the stark crags of Pallas seem insanely tilted. A steep road zigzagged toward the other summit.

Jenkins landed the tug in a lead-walled safety pit. He watched an uneasy attendant measure the em-

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anations from the ray-contaminated hull, and hastily post a warning sticker outside the valves. Displaying his own wrist geiger with the counter needle set back out of the caution sector, he went inside the building and bared his arm for a routine anti-radiation injection.

"Better get a skin test," the attendant warned him. "These shots don't help much. You may be dying, if you've had a whiff of radiation —and never feel a thing."

Jenkins nodded bleakly and looked around for his uncle.

Martin Brand hadn't come. Nobody answered the office telephone. Worried, Jenkins frowned at his watch. Seventeen-ten, Mandate time. The office must be closed, but his uncle had promised —

"Nicky!"

Brand's jovial greeting boomed across the dingy little waiting room. Past forty now, the famous engineer had kept his stomach flat and preserved his lean erectness. His wavy black mane was impressively silvered at the temples, and his reddish, hollow-cheeked face had a look of cragged candor. The somber honesty of his gray, wide-set eyes was almost hypnotic.

"Thank God you weren't in the blast, Nicky!" Brand gripped his hand. "I was just talking to old O'Banion on the scrambled beam, and he says poor Drake and McGee and the rest are in a bad way."

"Dying," Jenkins whispered, trying to swallow a throbbing tightness in his throat.

"Sorry I'm late." Brand's florid, rawboned face grinned apologetically. "But some rumor got into the market—some wild report that the whole Freedonia lab had blown up. Seetee Common fell ten points in ten minutes. I had to head off the bears."

Jenkins swallowed again, to find his voice. An old confidence in his distinguished kinsman was lifting his spirits, and he was glad to think of something besides the clinical aspects of radiation sickness.

"And—did you?"

"A neat little problem in financial engineering." Brand nodded easily, dropping his bluff voice. "I just countered that rumor with a better one—that Seetee was about to merge with Interplanet. The smart boys, I let 'em think, were smearing Seetee, to drive it down and buy it cheap. That report put it up sixteen points, before the exchange closed."

Brand chuckled genially.

"Too bad about those friends of ours, out on Obania." He nodded toward the dark sky, briefly sober. "But this little incident has made me a cool four million in paper profits, anyhow." Glancing at a diamond-cased watch, he turned quickly. "Let's go, Nicky. We're having dinner at the Tor. Got any luggage?"

Jenkins shook his head silently, trying to recognize, in this practical man of affairs, the audacious spatial engineer who had been the idol of his youth. He tried to swallow a

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vague sense of puzzled disappointment.

"No matter," Brand was rumbling. "Got everything at the Tor. You must stay out there till you get over this—you look done in, even if you weren't caught in the blast. Then I hope you'll consider an opening in the office here—"

"Hold on!" Jenkins caught the tall man's arm. "I've got to talk to you—privately."

"Right, Nicky." They were outside the building. The small sun was just rising above the tilted landscape—for Pallas didn't turn on Mandate time. The naked, topping peaks were all savage highlight and liquid night, and Jenkins shuddered to a brief illusion that they were all tumbling down upon him in a monstrous avalanche.

"Talk tonight, Nicky." Brand beckoned to a uniformed chauffeur in a long electric car, who pulled quickly toward them. "No time, now. We're picking up a couple of people, and Santiago likes to serve his dinners on time."

"Just a minute," Jenkins protested. "I want to tell you about that seetee blast. It's terribly important—"

He checked himself, as the silent car drew in beside them. Any rumor that contraterrene weapons and machines had been captured from Freedonia would be enough to disrupt the Mandate. One careless word could kill his feeble chance of completing the Brand transmitter.

"So's this." Chuckling genially, Brand waited for him to get in the car. "Several Interplanet stockholders called, you see, about that merger. With a little financial engineering we can nurse it into something more profitable than a rumor. We're working out a proposition tonight."

"Please—" Jenkins whispered, but Brand was speaking to the chauffeur.

"Mr. Gast's office." He turned back to Jenkins, urging gravely: "Nicky, you must try to forget Freedonia. I know this tragedy has shaken you, but we're going to build something bigger out of the ruins. If this deal goes through, we won't need Freedonia."

Jenkins sank back against the cushions. Overcome with a dazed amazement at the ruthless energy of this shrewd tycoon, he felt too dull and heavy with exhaustion to look for the youthful idealist who had written "Fifth Freedom"—or even to ask about Jane Hardin.

The driver whisked them deftly down the winding pavement to the other peak, and into the narrow streets that bound the terraformed hill. In his two years on lonely Freedonia, Pallasport had come to seem a splendid outpost of men against space, but now the reality of it was shabbily depressing.

The buildings, of sheet metal and colored glass, all seemed too flimsy and too crowded and too cheaply gaudy. The men and women he saw

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wore the garbs and spoke the tongues of all the planets; he thought they should have seemed brave and hardy pioneers against eternal night, but they were all too hurried and too grim. He recalled his uncle's cynical dictum. They were all predators, come to loot the asteroids for their planets or their corporations or their own private pockets.

Wistfully, he thought of the change that should come from the Brand transmitter. For the prize these men fought and schemed to control was the dwindling reserve of the fissionable elements. Free power would wipe out the unique value of them, and create greater values in their place. With all Pallas terraformed, men could really live here, instead of camping like restless vandals.

The unbounded power of the contraterrene drift could smooth the dark, topping crags beyond these poor streets into pleasant hills, cloaked with terrestrial green. Free power could build a better sort of civilization upon them, a world where want of energy and the things it made would never pinch the faces of men and women with the cruel, veiled ferocity he saw everywhere.

"Look at that, Nicky!" Brand caught his shoulder pointing eagerly. "Our new building, just finished last month. Three stories taller than the Interplanet tower!"

Jenkins blinked and straightened wearily. He saw the gleam of gold and the glint of purple glass and the glow of massive letters shaped of yellow fire, spelling:

SEETEE, INC.

"Cost two hundred millions," Brand was booming genially. "Just wait till you see the office I had built for you, in the advertising section. Paneled with knotty pine, all the way from Earth. More expensive here than platinum—"

Two hundred millions, Jenkins thought heavily, would buy more costly condulloy than he needed for the generator coils and the power cables and the transmitter elements on Freedonia. Two hundred millions would establish the Fifth Freedom, start the flow of power that would be new life for all the sick planets.

". . . to meet Adam Gast." He was conscious of Brand's genial voice again. "Sharpest lawyer in the Mandate. He's the one I hired to defend old Drake, four years ago. He pulled the strings to get our research license, and I've retained him ever since. There's his office."

The car was crawling through the most dismal section Jenkins had seen. The weary, bitter-faced men shuffling hastily along the narrow sidewalks looked as if they were all tormented, as he was, by secret knowledge of an unkind future. Eagerly, Brand pointed to a dingy sign in a window above a bar that seemed to have collected the human dregs of several planets.

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"An ugly street," Brand commented easily, "but Gast won't move his office. He fought his way up out of this human jungle, and I suppose his roots are still here." Brand told the driver, "Honk for him."

The horn blared, and they waited at the curb.

Jenkins sat watching bleak-faced men and defiantly painted women from many worlds. Lean native asterites, bearded Callistonians, swarthy Venusians, sun-burned Martians, sad-eyed Earthmen. They stalked into the bar from the pawnshops and the grimy eating places and the cheap flophouses as if seeking a brief escape from despair, and they reeled out again in drunken defeat.

The Fifth Freedom would change this street, Jenkins promised himself. For these were the people who had lost their battle to share the uranium and thorium of the terrene drift. Energy, to his engineering mind, was ultimately the basis of life. He saw these people crippled and wasted and dying for want of it, and he knew that the Brand transmitter could cure them.

"Adam!" Brand shouted suddenly. "Meet my nephew."

Adam Gast came down a narrow dark stair between the bar and a Venusian-Cantonese hand laundry. A tiny, swarthy man, he had sleek black hair, close-set black eyes, and a small pointed black beard. The precise and costly elegance of his dark clothing looked out of place on this impoverished street, but it seemed to Jenkins that his thin-lipped, sharp-nosed face still wore the veiled, intent desperation which belonged here.

"H'lo, Jenkins," Gast said curtly. His nasal voice was high and unpleasantly metallic. He got in the rear seat, nervously snapping open a thick brief case. His hands, Jenkins thought, were like yellow claws grasping.

"Excuse me, Nicky," murmured Brand, moving to sit with Gast. "You'll soon have company. We're picking up my secretary, to take dictation. Miss Hardin should interest you after Freedonia." He chuckled melodiously. "Right, Adam?"

Gast nodded morosely, bent over his documents.

"Here's our strategy," he droned. "If you want to force a merger—"

Jenkins had stiffened, glad they were too absorbed in the complicated compromises and subterfuges and evasions that his uncle called financial engineering, to notice his reaction. Bitterly, he told himself that no woman mattered to a man with just a week to live, but he couldn't help waiting with a breathless eagerness to see Jane Hardin.

She lived upon a more pretentious street, whose dwellers had been modest victors in the veiled war of the Mandate. The chaste shop windows displayed Callistonian furs and rare foods from Venus and glittering

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gadgets from Mars and books and gowns and jewels from Earth, all dear with the high cost of spatial transportation.

Jenkins forgot the quiet seed of death in his flesh when he saw the girl again, and remembered it with a silent gasp of pain. She was waiting on the chromium steps of an austere apartment building.

"Jane!" Brand called to her genially. "Meet Nicky!"

Jenkins, for an instant, could only stare. The girl had started toward the car, but she checked herself at sight of him, her hands lifting in a quick, defensive gesture. She was taller than he remembered, and her widened eyes turned dark as Vega seen from space.

"Like her, Nicky?" chuckled Brand.

He nodded, voicelessly. She stood trim and proud and very lovely in a short jacket of blue Callistonian fur. Shoulder long, her hair was golden as the luminous fringes of the sun's corona. She seemed to catch her breath, and she came smiling to the car.

"Hello, Nicky!" Her cooing voice seemed deliberately sweet. She caught his hand with a warm pressure, and he felt the trembling of her own. She settled herself beside him, calling gayly back to Brand:

"Nick and I are old friends."

Were they, Jenkins wondered. He turned on the seat to watch the face he had tried so long to remember and forget. Her skin was very fair over lean flesh, the mouth firm, the chin strong, the cheekbones high. He saw strength and character and courage, and beauty, too; but still he didn't understand her.

"I'm so upset." Crisp with the accent of Earth, her voice was warmly concerned. "About the wreck—Mr. Brand told me. I know Captain McGee. Used to bring his requisitions to the office. Such a quaint, ugly little darling of a man!"

Her blue eyes turned dark again with sympathy.

"Are you sure there's no hope for him?"

"None." Jenkins couldn't help the pain that made his answer brief and harsh. "For any of them!"

"But you weren't hurt at all?"

Jenkins gulped and failed to speak. He shook his head stiffly. He felt a shaken impulse to tell her everything, and put it down ruthlessly. Pity wouldn't help him finish the Brand transmitter.

Jane Hardin seemed to perceive his mute pain, for she began chattering brightly about the wonders of Terran Tor. Jenkins tried to relax beside her. He listened to the melody of her Earth-accented voice and tried not to think of the implacable shadow upon him.

IX.

No dark plant of death was rooted in the girl's white flesh. Life, in her, burned fine and clean and strong. Watching the lean, strong planes of her face and the clear

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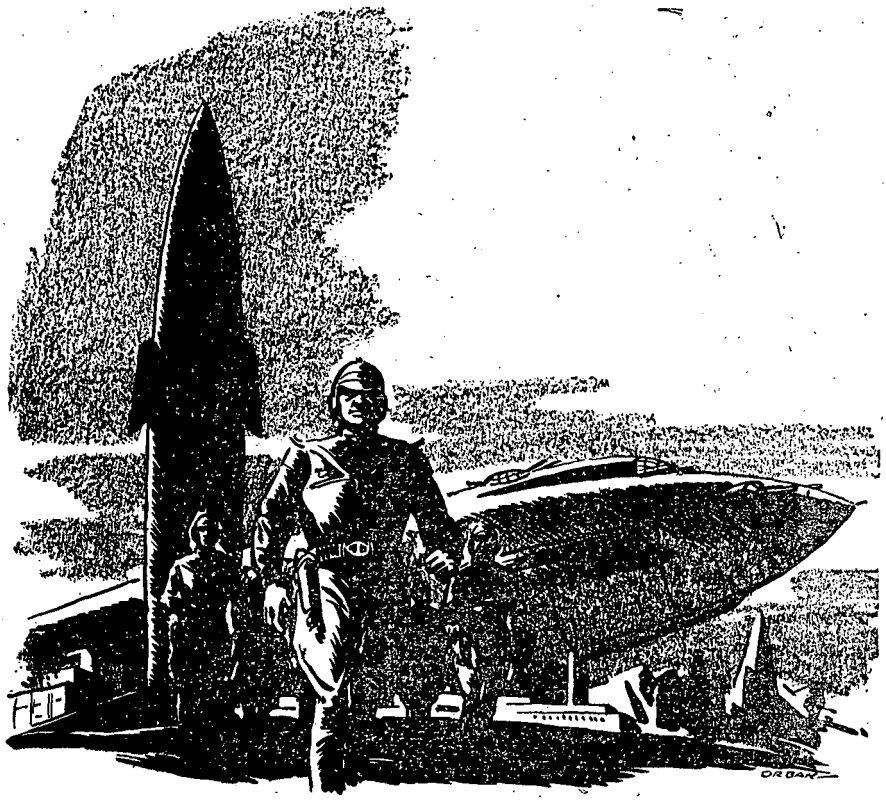
candor of her eyes, Jenkins drank in her warm vitality. But there was something he had to ask her.

"Tell me, Jane." The chance came when Brand and Adam Gast, whispering over their papers, raised a glass partition in the car. "Why are you working for my uncle, now?" He couldn't help the blunt intensity of his hushed voice. "Two years ago you didn't seem to like our family."

She faced him, blue eyes transparently grave.

"Sorry, Nick." Her soft voice seemed contrite. "Then I thought your uncle was . . . well, a crook. You see, my father had lost most of his fortune on one of his schemes, which was why I had to go to work. I met your uncle, later, and found I'd misjudged him. I'm glad to work for Seetee."

Jenkins smiled at her, relieved. That rekindled something of the lost kinship between them. He recalled that they had come from the same modest suburb of Panama City,



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and wondered briefly if he had ever seen her as a freckled girl.

"It is wonderful," he agreed quietly, "to have a part in the taming of contraterrene matter. I think that's the greatest thing men have ever tried to do."

"The most dangerous, surely." Solemn with awe, her blue eyes searched his face. "I've always wondered about such men as you—and poor old McGee and those others dying of seetee shock." Her hushed voice seemed honestly bewildered. "Tell me—knowing that the tiniest slip will kill you, why do you keep on trying to work that terrible stuff?"

"Don't you know?" Jenkins asked. "Haven't you read my uncle's book?"

Her bright head nodded. "But still I don't understand."

Awkwardly, then, Jenkins tried to share with her the magnificent vision he had first discovered in the pages of "Fifth Freedom," and found again in the lives of those bold and patient engineers now dying for it on Obania.

"Think of all the drift can do," he urged. "How it can change—everything!"

She waited, frowning slightly.

"Energy is the basis of wealth—even of life." He had to pause, fumbling clumsily for words. "Energy applied intelligently to matter creates all material wealth. There's plenty of matter and a reasonable amount of intelligence, but people are starved for energy. That hunger twists them. It makes them cheap and mean and ugly and selfish and blind. It kills them—in many ways."

He gestured desperately.

"Free power from the Brand transmitter can change human life." He tried hard to reach her, but the words were stubborn and slow. "It can remove the deforming pressure of want. It can make living open and healthy and magnificent."

Her blue eyes were smiling.

"A beautiful idea, Nick." For a moment he thought she understood, until he saw the tiny frown creasing her white forehead. "A very noble dream, and I admire you for it. But, human nature being what it is, I'm afraid you'll never find that goal."

"The Fifth Freedom can change human nature—" Jenkins began urgently, and checked himself. For the car had stopped on the main spaceport on the crown of the hill, beneath the tapered shining column of his uncle's yacht. He followed the girl up the ramp, and through the open valves.

"Don't you love the *Adonis?*" she was cooing eagerly. "Let's go up to the observation deck. You get such a gorgeous view of the city and the mountains and the Tor."

He followed her into the tiny elevator. It troubled him to find such a blind spot for the final glorious goal of contraterrene research in an employee of Seetee, and hurt him to lose that sense of a vital partner-

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ship. But he said no more of the Brand transmitter.

She had to stand close against him, in the narrow cage. Her blue fur jacket brushed his arm, and he caught the clean odor of her hair. Her nearness made him want desperately to live, and it recalled the dark shape of death growing in him. He felt too numb with fatigue to talk any longer of that vast dream.

Terran Tor stood two hundred kilometers west of Pallasport, a rounded peak of glowing life on one solitary summit of a dead chain mightier than any range of Earth. The peaks around it, caught now with the rising sun, were daggers thrust from chasms of the dark. The yacht landed on the hill, ten minutes from Pallasport.

Eagerly, as Jenkins followed her off the craft, Jane Hardin pointed out the wonders of the Tor. Golden roofs and walls of purple glass toppled away from the tiny, convex field, down the curve of the terraformed summit. Blue water in a huge pool bulged visibly above the gleaming tile around it.

"Come," she whispered, "let's watch the sunrise."

She led him past the shining mansion to the brink of a black-walled canyon aglow with the feathery green of terrestrial plants. Standing at the edge of that tiny island of life, they watched dead, tremendous summits burst from seas of night into harsh reality as the probing light found them.

"Isn't it magnificent!"

Jenkins nodded, but his mind saw a vaster view. He saw all Pallas aglow with life as the Tor was, and a thousand other naked rocks. The Brand transmitter, it occurred to him, could be completed and set in operation for far less money than his uncle had squandered on this baronial estate.

But he didn't speak of that. He felt too weighed down with weariness to shape the words to bring his vision to the girl, and he didn't want to quarrel with her. Death was a cold and heavy reality within him, and he needed her to help sustain its crushing burden.

"Forgive me, Nick." She looked at him with a quick understanding that moved him to grasp her hand. "I had forgotten what you must have been through. I suppose you're very tired."

They turned back across a costly lawn, hand in hand, toward a vast window that stood open under the golden eaves. Jenkins grinned at her gratefully, warmed with a sense of comradeship. Her strong fingers tightened suddenly on his, as if with pain.

"What is it?" he whispered.

She stopped on the convex level of the lawn, her blue eyes dark with dread.

"After this—" Her smooth throat pulsed before she could finish. "After this disaster—you won't go back?"

Jenkins dropped her taut hand. He laughed mirthlessly, deliberately

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breaking that brief bond. Still he didn't understand her, and suddenly he doubted her neat little story about why she worked for Martin Brand. But he didn't want her falling for a dead man.

"Yes," he told her harshly, "I'm going back."

They went on to the purple-walled mansion, walking stiffly apart. The girl's full lips were tight, and he nodded with approval at the anger in her eyes. That was better than the agony he had seen in Karen Drake's.

Inside that manorial dwelling, a quiet Latin-featured servant showed Jenkins to a spacious teak-paneled bedroom, and drew his bath. A suit of his uncle's white dress pajamas fitted him not too loosely. The swarthy man adjusted the mauve sash for him, and told him that dinner was served, *señor*.

His uncle and Adam Gast were still absorbed in their merger scheme at dinner. Jane Hardin had turned aloofly quiet. Jenkins ate silently. The dark-faced chef had cooked dishes rare in the Mandate, but food didn't seem important now. Fatigue rocked Jenkins in his chair, and the insistent drone of legal terms and financial stratagems hurt his head.

"Better turn in," Brand told him, when the meal was over.

"Not yet." Jenkins straightened desperately. "I must tell you something, first."

"Won't tomorrow do?"

Groggily, Jenkins shook his head. "But we'll be busy half the night, drawing up this offer."

"Better listen," Jenkins said grimly. "What I have to say ought to change your plan!"

"All right, Nicky," his uncle yielded genially. "I'll give you an hour, right now." He turned to Adam Gast. "You can dictate a first draft, while I hear Nicky's confession." Chuckling, he caught the weary arm of Jenkins. "Come on to the den."

X.

The room Martin Brand called his den was a tall, spacious chamber with a gleaming mahogany bar across one corner. Great windows looked up the precipitous apparent slant of Pallas. There were books and paintings and easy-chairs.

On Earth, such a room would have been a mark of merely moderate wealth. On this bare frontier, however, where the resources of most men were drawn lean to fight a cruel environment, the display of it seemed arrogant.

Brand poured himself a drink and offered one to Jenkins.

"Best Scotch in the Mandate," he urged. "And, you look as if you need it."

Jenkins shook his head, laboriously.

"I haven't time to squander," his tired voice rushed. "I've got to tell you what happened on Freedonia—"

"Don't fret yourself about it,

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Nicky. Humpty Dumpty fell, and you can't pick up the pieces." Gesturing at a great chair, Brand opened a fragrant humidor. "Try one of my special Havanas."

Jenkins waved the cigars away impatiently.

"This is bad news," his dry voice rasped. "That blast was caused—"

"Let's not be quite so grim, Nicky!" Brand sank into an easy-chair, grinning genially over his dewy glass. "This thing must have been pretty ghastly, and I know those unfortunate men were your friends—but we can't look back."

Brand shook his clinking glass.

"Buck up, Nicky. I'll listen to the gory details, if you insist—but Freedonia doesn't really matter, any longer. We beat that crisis, this afternoon. The merger, if we're quick enough to pull it off, can protect us against anything—"

"Except seetee weapons!"

"What?" Brand set his glass down, startled. "What's that, Nicky?"

"Contraterrene weapons," Jenkins rapped grimly. "I've been trying to tell you, ever since I landed. Our seetee arsenal has been robbed—expertly, with inside help. I think Lazarene sold us out, but I can't guess which planet bought him."

Jenkins watched the stiff amazement on Brand's ruddy, rawboned face.

"Whoever did it," his bitter voice went on, "they got away with plenty. Tons of finished missiles. Machine tools to make more war heads. Lazarene's seetee know-how—which is more important."

Jenkins gulped at the husky dryness in his throat.

"They've bought an easy victory in a new spatial war," he croaked hoarsely. "Unless we stop them—"

"Listen, Nicky!" Brand had lifted his wet glass again, with iron fingers that showed no tremor. His terse voice was oddly hushed. "Were Drake and the rest hurt by a seetee shot—not by accident?"

Jenkins nodded. "Killed."

Brand's gray eyes narrowed piercingly.

"Did you mention that, to anybody?"

"No." He watched his uncle's taut face relax. "At the clinic, Worringer naturally thought the ship had struck a whiff of seetee dust. I let him go on thinking so."

"You're all right, Nicky!" Brand took a deep pull at the drink, his cragged face grinning candidly. "You'll make a financial engineer."

Jenkins flinched from the phrase.

"I knew the least rumor of seetee warfare could upset the Mandate," he explained. "It could wreck our chance to finish the Brand transmitter."

"Smart work." Brand beamed. "Though we'll have to forget the transmitter anyhow, for the time being."

"No!" Jenkins rose abruptly, trembling. "The Fifth Freedom—free power from our plant on Free-

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donia—is the only thing that can stop a Spatial War."

Brand smiled tolerantly.

"How do you figure that, Nicky?"

Jenkins felt his lean fists clench and open, as he groped for words to shatter his uncle's bland skepticism.

"The loss of those tools and weapons and Lazarene's know-how is just like a seetee shock to all the planets," he said desperately. "They don't feel it yet, but death is in them. The seeds of contraterrene war are planted."

Brand murmured easily: "An ingenious analogy, Nicky."

"Those raiders fired a seetee shot at Freedonia." Jenkins drove grimly on. "That means they aren't interested in the real, creative power of seetee. What they want is control of the thorium and uranium reserves."

His uncle nodded, smiling.

"An excellent political analysis, Nicky."

"But the Brand transmitter can prevent war for those fissionable elements," Jenkins insisted. "With free power everywhere, war for power can't exist."

"Quote," Brand murmured sardonically. "From my own book, I believe."

"It was true when you wrote it." Jenkins tried to lower his voice. "It's still true. We must finish the Freedonia plant, before that unknown enemy is ready to strike."

Calmly, Brand sipped his drink.

"I'm afraid that might be difficult."

"Our installations weren't damaged by the shot," Jenkins assured him. "I know the whole rock is poisoned with radio-isotopes, but the machines are intact and the fuel bins are full. All we need is the condulloy that Mr. Drake ordered, to complete the transmitter."

Smiling regretfully, Brand shook his lean, impressive head.

"I promised Drake that metal," he agreed. "But condulloy costs two millions a ton, and we must buy it slowly. The market can't absorb—"

Staring hard at the candid, ruddy face of Brand, Jenkins broke in abruptly. "I understand you have already bought three hundred tons of condulloy for Freedonia."

Brand's lean jaw sagged, and his gray eyes narrowed.

"How do you know that?"

Jenkins shook his head.

"You win, Nicky." Brand chuckled cheerfully. "I believe you do have the makings of a financial engineer, after all." He rose lazily. "Would you like to see the metal?"

Jenkins nodded, watchfully.

Tall in the magnificence of gold-and-purple dress pajamas, Brand moved deliberately to the mahogany bar. Swinging it away from the wall, he revealed a hidden doorway. Jenkins followed him down the narrow steps beyond.

The aluminum segments of a paragravity loading tube were coiled like a monstrous serpent in the rock-hewn tunnel below. Brand knelt,

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beyond it, to work a combination lock. He swung open a heavy steel door, and stepped back dramatically. Jenkins peered wonderingly into a wide steel vault, piled high with silver-gray ingots.

Trembling, Jenkins turned to Brand.

"If you had this metal, he demanded savagely, "why didn't you keep your promise?"

"I'll tell you," Brand murmured. "Come on back to the den."

He locked the massive door again. Shaken with a bitter amazement, Jenkins followed him back past the retracted loading tube to the pleasant room above. He swung the bar back over the doorway, and carefully mixed himself another drink.

Jenkins waited, in a sick daze of apprehension.

"Cheer up, Nicky." Brand took an easy-chair. "Better have a drink," he advised sardonically. "Because you're going to need one."

Grimly, Jenkins shook his head.

"I like you, Nicky," Brand went on. "I feel you've earned my trust. That's why I'm going to tell you the truth about Seetee, Inc."

"What about Seetee?"

"You're an excellent spatial engineer," Brand said, "but you don't seem to know the principles of financial and political engineering. You don't appear to understand that our firm is a rather paradoxical enterprise. While it is chartered and licensed to do contraterrene research, the first condition of its existence is the continued failure of all such experiments."

Jenkins stiffened to a bleak astonishment.

"Old Jim Drake would never understand that," Brand continued, "though I tried to tell him. He insisted on going ahead as if he actually intended to complete the transmitter and deluge the planets with free power."

"He did," Jenkins whispered. "Why not?"

Smiling tolerantly, Brand finished his drink.

"Because the Fifth Freedom would ruin Seetee, as surely as it would Interplanet."

"Then what's the purpose of the corporation?"

"Now we're getting places, Nicky." Brand nodded his dark, distinguished head, approvingly. "All you need is an engineer's understanding of the economic and political forces acting in the Mandate, and you'll see the necessary answers as clearly as I do."

Jenkins shook his head stubbornly.

"We might begin a generation ago, with the Spatial War." Brand lighted a fat blond cigar. "History says the Allied Planets won. History, as usual, is wrong."

"But the planets got their freedom."

"No more than Interplanet had already granted them," Brand retorted. "They were all still dependent on power metals from the terrene drift, and Interplanet played on their own jealousies to make them

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accept the Mandate for the asteroids —to referee the cold war that Interplanet is slowly winning."

"But free power would stop that war."

"It might." Brand nodded tolerantly. "Except that no major planet is willing to accept the economic and political impacts of contraterrene power—nobody with a stake in the *status quo* wants that kind of seetee shock!"

Jenkins winced from that phrase.

"But seetee weapons are in a different category," he broke in bitterly. "Every planet has been pouring out money to get them, and one planet bought Lazarene—"

"You're jumping ahead of our story," Brand reproved him gently. "Four years ago, when I came to the Mandate in search of a profitable promotion, that was the situation I found—deadlock!"

Brand exhaled pale smoke.

"None of the planets was winning that cold war, or making any progress with seetee research. The engineers were killing themselves before they learned any secrets for the spies to steal. Drake—the only man with any real know-how—was on trial for illicit experiment." Brand chuckled infectiously. "What a situation!"

Jenkins stiffened bitterly.

"Made to order for a bit of expert financial and political engineering." Brand gestured expansively. "Those stupid bureaucrats were about to jail the only man able to work the drift. I saw the opportunity, and Gast helped make the arragements."

"I—" Jenkins swallowed hard. "I don't get this!"

"Just a bit of engineering," murmured Brand. "Intelligent analysis and logical use of existing forces. All the planets wanted seetee know-how. Old Drake had it. So I founded Seetee, Inc."

"You don't mean—" Jenkins shook his head unbelievingly. "You didn't sell Drake's seetee technology."

Brand nodded urbanely.

"But not in any very useful form," he explained. "I processed Drake's confidential progress reports to remove any really valuable hints, and then disposed of them through Adam Gast to the various commissioners—always arranging to let each man feel, for a price, that he was getting something unique."

Jenkins stumbled to his feet, lean hands knotting into quivering fists. He wanted to smash the red, hollow-cheeked, sardonic face of the big man in the chair, but Brand merely grinned.

"I know exactly how you feel, Nicky," he said sympathetically, "because I went through the same thing myself, twenty years ago. The trouble is what they teach you in school."

Jenkins let his fists relax, still breathing hard.

"They make everything seem so easy," Brand went on. "They teach you astrogation and nucleonics and paragravitics and everything else in

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spatial engineering. You think you can make all the planets over into scientific wonderlands. But you're wrong, Nicky."

Brand's red, rawboned face, for an instant, seemed sadly wistful.

"Because they don't teach you practical politics or real economics. The technical problems are easy, but they don't teach you human nature. And that's the real barrier to the sort of wonderland that young engineers dream about, Nicky. The blind ignorance and crushing stupidity and clutching greed and sheer cowardice of human beings!"

Brand gestured largely with the dead cigar.

"That's the field before you, Nicky. You must learn to analyze those human forces, as I do, and exploit them efficiently. You'll find that field far more profitable than ordinary spatial engineering."

Jenkins gulped.

"Look at my own career," Brand urged him smoothly. "As a young fool, idealistic as you are, I proposed an honest effort to establish the Fifth Freedom. All I got was my name on a black list. But now, founding Seetee for any other purpose, I've become a billionaire."

Jenkins clenched his fists again, to try to stop his voice from quivering.

"So the whole firm is a fraud?"

"I don't like the word," Brand protested amiably. "And it doesn't really fit. When you steal a billion dollars, it becomes very respectable high finance. Our investors appear to believe that we'll soon be selling power to all the planets, even though common sense ought to tell them that any real success would break the corporation."

Jenkins sat down again. He caught his breath and tried to think. Staring unbelievingly at the lean, lazy stranger in the other chair, he tried in vain to understand him.

"I'm not that bad, Nicky," Brand protested softly. "The most respectable men in the Mandate are our partners in this scheme. The first block of Seetee shares was bought by the branch manager of Interplanet—"

"Tell me this!" Jenkins broke in harshly. "If you didn't ever mean to build the transmitter, why have you bought that condulloy?"

"For emergencies." Brand grinned innocently. "It's a convenient form of wealth, compact, portable, anonymous."

Jenkins swayed, biting his lip.

"Something else," he rasped. "If you were selling us out, which planet would be the highest bidder? Whose man is Lazarene?"

"Please, Nicky!" Brand's rugged, honest-seeming face looked hurt. "Even if the cruel realities of life bruise your tender idealism,—you ought at least to credit me with too much intelligence to sell seetee weapons to any power."

"Somebody bought them," Jenkins rapped flatly. "Somebody is about to open a seetee war. Whatever you're done—can't you see that the only way to stop it is to start the Brand transmitter?"

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"You're naive, Nicky." Brand sighed regretfully. "I'm afraid you haven't been listening. The raid on Freedonia is likely to precipitate a grave interplanetary crisis, I admit. But the practical answer is no romantic experiment with any high-sounding Fifth Freedom. The real answer, soundly based in political and economic engineering, is our merger plan."

Jenkins blinked from speechless outrage.

"Don't you see the balance of forces, Nicky? And don't you understand that the mere threat of see-tee war enormously increases the potential value of our shares?" Brand looked at his watch. "Now you really must excuse me—Gast will be waiting."

"But you can't—" Jenkins staggered weakly upright, lean arms lifted in a shocked gesture. "You can't waste time cooking up another crooked scheme, while the peace of the planets is hanging in the balance. Let me have your yacht and eighty tons of that condulloy—"

Brand was chuckling softly.

"You're out of your head, Nicky. No wonder, I suppose, after all you've been through. Ask Amador for a sleeping pill if you need it." Brand was at the door. "Good night, Nicky. I think you'll feel better in the morning."

XI.

The world had fallen apart.

Even the stern verdict of Dr. Worringer had not shattered Jenkins utterly. The bright code of the spatial engineers had maintained his purpose and his courage, even when he knew that he was dying.

Now, however, the blandly sardonic words of his famous uncle had leveled everything. That fine tradition was smeared and trampled. If Martin Brand, the greatest of all the spatial engineers, could calmly confess such monstrous frauds—what was the use of anything?

Jenkins didn't need a sleeping pill. His purpose was turned to hollow mockery and his hope was broken. He staggered back to the empty splendor of the teak-paneled bedroom, and meekly let the swarthy servant waiting help untie the knotted sash, already reeling with sleep.

He woke early. The sun was gone again, and the towering ranges beyond his windows loomed gray and immense in cold starlight. The mansion was very quiet. He sat up in the huge bed, remembering that he had an urgent job to do.

It took him a moment to be sure that Worringer's sentence was anything more than an evil dream, because the mechanism of his body had reacted while he slept, against fatigue and despair. The seed of death was planted in him, but still he felt quite well.

Hope and purpose, too, had somehow knitted back again. Sitting on the edge of the bed in the dark, he began to think of ways to remove eighty tons of condulloy from his

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uncle's secret vault to poisoned Freedonia.

That appeared remotely possible until he padded silently to open his door and peer down the wide hall toward his uncle's den. A dark man sat at a little table there, polishing silver with his hands but sweeping the hall with black, narrowed eyes. That guard saw Jenkins, and stiffened silently.

Jenkins closed the door.

Martin Brand was evidently well prepared to defend his precious hoard. These swarthy men were doubtless loyal, and Brand was armed and armored with his influence and his great wealth. His genial suavity, Jenkins sensed, concealed a ruthless resolution.

Restlessly, Jenkins dressed. The time was nearly six, but still the mansion was quiet. He wondered how long such peace could last, since the raid on Freedonia; and a pang of sharp unease made him turn on the little photophone receiver by his bed, twisting the knobs that moved the mirrors and tuning prisms on the roof above, hunting a news broadcast.

He got the petulant drone of a recorded voice on Jupiter Light, reading statistics to prove the accomplishment of the newest ten-year plan on Ganymede in six years, and indignantly denying capitalistic charges that slave labor had been used in the Ionian thorium mines.

He got Luna Light, and a singing commercial urging listeners to take a trip on the Seetee ship, to buy a suite on Easy Street—Twisting the knob impatiently, he caught a blare of dance music, which ceased abruptly.

"Ladies and gentlemen, we interrupt this broadcast to bring you an important official announcement." The speaker sounded too silkily suave. "This is Mandate Light, the voice of the asteroids, serving your government. And there's no cause for panic!"

Jenkins caught his breath, leaning over the instrument.

"Here are the facts," the butter-voiced announcer went on. "The five commissioners, representing the four major planets, formally deny the vicious rumors which have been circulated tonight by members of the outlawed Free Space Party. Lies—stupid lies!"

Jenkins felt a cold prickling along his spine.

"You can relax," the suave announcer cooed, "because there is no hostile fleet, from Mars or any other planet, operating in the space of the Mandate. There is no truth to reports of sabotage in the Pallasport terraforming unit and the bases of the High Space Guard. There has been no fighting on Obania. And there's certainly no danger, the commissioners all agree, of seetee war."

Jenkins turned numb and breathless and ill.

"The commissioners wish to be most emphatic about that," the oily voice insisted. "Long research, conducted by various planets, has only established the impracticability of

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utilizing the contraterrene drift for military purposes. So we can all relax!"

The announcer chuckled cheerfully.

"Forget the rumors," urged the sugared voice. "They are only intended to divide and disrupt the government. They won't succeed. The High Space Guard has already been ordered to arrest all suspected sympathizers with the Free Space Party.

"That illicit organization has always opposed the Mandate and foolishly demanded freedom for the asteroids. Its agents have been implicated in many acts of violence. The government is now sternly resolved to stamp it out forever.

"So there's no reason for any alarm, ladies and gentlemen. Ignore the rumors you may hear—and keep your photophones tuned to Mandate Light, for the latest authentic news and the best in recreation. We now resume the interrupted dance music of Stony Joe Stone and his Rock Rats, with the selection—"

Jenkins snapped off the instrument and stumbled dazedly to the wide windows. The announcer's voice had seemed too sweet and sure. Only a desperate crisis, he thought, could have got the commissioners out of bed at this time of day to issue such a statement.

Seetee shock had already struck the Mandate!

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Perhaps it could be cured with power from the Brand transmitter, but his own time was running out. He opened a window and stepped out on the costly lawn and filled his lungs with the Tor's crisp air. Stretching his lean body, he turned his hands in the white starlight and swallowed carefully.

The dark seed in him hadn't sprouted yet. He still felt good. His flesh was strong and firm. There was no rawness in his throat—not yet. But his last few days were running like sand through his fingers, and still he could discover no reasonable means of getting back to Freedonia with eighty tons of condulloy.

The tiny spaceport lay above the dark lawn, the slender nose of the *Adonis* standing tall against the misty splendor of the Magellenic Clouds. He scouted toward it innocently, strolling silently under the shadow of the golden eaves, until a soft voice stopped him.

"Please, *señor!*" Turning with a nervous start, he discovered the lean servant, Amador, close behind him. "Please don't risk your life." The dark man smiled apologetically. "The good *patron* would be offended if we allowed you to be killed."

"Killed?" whispered Jenkins. "How?"

"There are defenses, *verdad.* Truly." Amador shrugged delicately. "Lest *bandidos* come! But let us not speak of any unpleasantness, *señor.* For coffee is served on the east terrace, and Miss Hardin asks if you will join her."

Beyond Amador, Jenkins could see another dark compact man, carrying a rifle, pacing back and forth below the bright valves of the yacht. Martin Brand had not accumulated that hoard of precious condulloy, he reflected, without learning how to keep it.

Nodding in surrender, he followed Amador to the east terrace. Jane Hardin looked up from a small table beside the golden railing, smiling in the cold starlight.

"Good morning, Nick." The aloofness was gone from her quiet voice. She rose and stood near him while the dark servant poured coffee, gesturing at the toppling, tremendous ranges and the jeweled night above them. "Splendid, isn't it?"

Jenkins nodded, wondering what she wanted.

"Nick, I didn't sleep well." Her voice turned low and uncertain, when Amador had moved silently away. "I was thinking about last night. I'm sorry if I seemed—unsympathetic."

"Does it matter?"

"I think so." She paused, watching his face in the gray starlight. "I don't quite know how to say it—but people can have different viewpoints, and still be friends. I know this effort to work seetee must be important to you—insane as it seems to me. I can admire you for wanting to go back to Freedonia—even though I think you're just throwing

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a very useful life away. I . . . I just wanted to say that, Nick."

Jenkins sat stirring his coffee with an unsteady spoon. The eagerness on her white face made the fact of his coming death throb like an open wound. But she had come to the Tor, he recalled, to help with the merger scheme. If Martin Brand were the ruthless financial buccaneer he seemed, she must share the guilty secrets. Quietly he asked:

"Don't you think the conquest of seetee might be worth a man's life?"

The girl put her elbows on the tiny table. Her oval face, in the austere radiance of the stars, was smooth and lovely and very grave.

"I'm afraid of seetee, Nick."

"So am I," Jenkins said, "but still I want to tame it."

"I'm more afraid of tamed seetee," she told him. "That's more dangerous than the drift."

"It couldn't be!"

She frowned in the chill gray light arranging her words.

"Physical power creates economic power." Her voice was sober and slow. "Economic power generates political and military power. That's history. The energy of human slaves made the Roman Empire. The greater energy of burning coal established the British Empire. Fission energy built the vaster empire of Interplanet. What would contraterrene power do?"

"Anything men want," Jenkins told her. "The energy in the drift is limitless."

"Too limitless." Her low voice was almost foreboding. "It can unlock boundless wealth and power—for a few bold men to grasp, as they always do. Seetee would create a new kind of dictatorship, I'm afraid. Because the very fear of its dreadful power would force the dictators to abuse it ruthlessly."

She smiled wistfully in the thin light.

"I admire your courage, Nick," she went on softly. "I wish I could share your confidence that seetee will build a better world. But I'm afraid the planets aren't ready to stand the impact of a successful seetee technology—"

Her voice died away.

For a terrible light was blazing in the black sky. It lit the sloping lawns and the glass walls and the girl's taut face with a brightness that burned out color. It blazed savagely on the dead ranges beyond the railing, turning them all to cruel blades of incandescence thrust out of black shadow.

It faded.

Jenkins found himself upright, his coffee spilled across the little table.

"Sorry!" He dabbed automatically with his napkin, trying to keep the liquid from dripping on the girl. "Nerves, I guess."

He glanced at the geiger on his wrist, and peered upward. Still the stars were blotted from his dazzled vision, but he found the dimming point of white above. It yellowed as he watched, reddened, and went out.

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"Nick!" She was breathless. "Did it—?"

He saw her staring at the face of her own wrist geiger, terror dark in her eyes. He grinned at her feebly, shaking his head.

"You aren't hurt—yet." His voice was dry and shaken. "That was a seetee blast, but a long way off." He sat down again, because his knees were weak. "Could be you're right," he muttered faintly. "About what seetee will do to men."

"How, Nick?"

"I think the impact of the seetee technology has already begun," he told her quietly. "I think that flash was a spacecraft—probably a warcraft of the High Space Guard—struck by a seetee missile!"

She caught at her white throat.

"This is—dreadful!" Her voice went husky with pain. "There'll be panic. We must wake your uncle and Mr. Gast, and get back to town."

"There'll be worse than panic, Jane." She was rising but he reached to catch her quivering arm. "Please," he whispered desperately, "I need you—to help me stop a seetee war!"

She peered at him dazedly.

"You can help," he insisted sharply. "The condulloy we need on Freedonia is stored here at the Tor. My uncle has been . . . well, stealing it! If you can help me recover eighty tons—"

She was shaking her head.

"I'm not trusted that far." Her voice was dull, bewildered. "And your uncle's servants answer only to him. They're a pretty warlike crew, simple and loyal, from the little rock Nuevo Jalisco. He has been very generous to them and their families, and he's the *gran patron.* They would all die for him—or his private treasure."

Black in the starlight, her troubled eyes stared at him.

"But . . . tell me, Nick . . . what do you hope to do?"

"Jane, I think you're—honest." His voice was hoarse, hurried. "When you understand what happened on Freedonia and what's going to happen to men everywhere—I think you'll want to help me start the Brand transmitter."

She bent to listen, puzzled.

"Because it's too late to stop the impact of seetee against civilization," he told her. "The destructive force of it is already free—we had developed seetee weapons at the lab, and now they're in the hands of an unidentified power. That flash was seetee war beginning!"

She nodded in the starlight, and he began to hope.

"The only force strong enough to contain that violence—to stop the war—is the creative phase of our new technology," he went on grimly. "The limitless free power from the Brand transmitter!"

"Perhaps you're right, Nick," she whispered. "If that was really a seetee shot—"

He thought she was yielding. A breathless hope had already lifted him, when he saw her stiffen. Voiceless with alarm, she pointed. Jen-

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kins peered up to see a long shadow sliding down across the stars, to the narrow spaceport.

The shadow was a tall black cruiser of the High Space Guard. The valves of it clanged open. An iron-faced Martian-German lieutenant tramped down the ramp, with five armed spacemen behind him. He barked something to the sentry beside the *Adonis*, and came marching to the tiny table on the terrace.

"*Herr* Nicol Jenkins?" His voice was harshly violent, and his words came to Jenkins like stunning missiles through a haze of shocked incredulity. "Arrest . . . anything you say may be used . . . special warrant . . . treason against the Mandate—"

Swaying weakly, Jenkins flinched from the cold pressure of the handcuffs. Mute with a shaken despair, he could say nothing coherent. Vaguely he heard the girl's sharp questions, and the Martian's guttural answer.

"An unidentified spatial force has fired contraterrene weapons against the High Space Guard." The Martian licked his sunburned lips and looked around him sharply, as if warily expecting another seetee shot from somewhere on the Tor. "The only known facilities which might have been used to manufacture seetee weapons are those on Freedonia, owned by Seetee, Inc."

His hard eyes glared at Jenkins.

"My orders are to arrest all the officers and engineers of that corporation."

Jenkins gulped and failed to speak.

"But I'm sure they aren't guilty of any such crime." He was mutely grateful for the girl's quick protest. "Neither Mr. Jenkins nor Mr. Brand. The facilities on Freedonia were built and operated under a special research license."

"Did that license cover military research?" rasped the Martian. "*Nein!* Anyhow, the high commissioners have already canceled it, and these men must answer for the crime of contraterrene war."

XII.

Jenkins saw his uncle's arrest.

Brand came striding out of the gold-roofed mansion on the Tor, a majestic figure in a gold-and-purple robe, the tiny attorney tagging indignantly behind him. He glanced up at the towering cruiser, and turned imperiously upon the Martian, demanding:

"What is the meaning of this invasion?"

"You are *Herr* Martin Brand?" The lieutenant seemed stiffly respectful of his vast wealth. "We must request you to accompany us. You are charged with treason."

"Treason?"

Brand smiled sardonically. And Jenkins, stunned and ill from the shock of his own arrest, felt a grudging admiration. For his uncle's lean, rawboned face showed no dismay. The gray candid eyes wid-

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ened to a brief surprise, and narrowed with veiled purpose.

"One moment." Brand looked at his watch, and turned to Adam Gast. "We must move a little faster," he said calmly. "Go ahead with the merger—and get us out when you can."

"You'll be free by noon." Gast smiled with uneven yellow teeth. "And I'll take our merger memorandum to Interplanet as soon as it is typed—"

"But—Mr. Brand!" Jane Hardin moved toward him quickly, taut with alarm. "Our research license has been canceled—that means trouble for Seetee!"

"We thrive on trouble." Brand chuckled softly. "If there's any threat of seetee war—"

Harshly, the Martian cleared his throat.

"Seetee war is a fact, *Herr* Brand!" he rasped. "Seetee missiles have been fired upon craft and establishments of the Guard."

"Indeed!" Brand's narrowed eyes lifted to the pointed shadow of the ship against the stars. "In that case, the commissioners would appear very foolish to take any measures against the only firm possessing seetee industrial facilities."

His reddish, hollow-cheeked face reflected nothing more than offended honor as he added the quiet-voiced question:

"Who are these attackers?"

For an instant, behind the bleak, sunburnt military mask of the Martian, Jenkins saw frightened bewilderment. The lieutenant licked his dry lips again, and stiffened the painful straightness of his shoulders.

"The identity of the attacking force is not yet known, *Herr* Brand," he said harshly, "but I am ordered to secure that information from you and *Herr* Jenkins."

Brand's lean, honest face hardened with indignation.

"You may inform your superiors that our firm has not supplied contraterrene weapons to the forces of any power."

"You must come with us." The Martian studied him with hard eyes. "The matter is exceedingly grave, *Herr* Brand."

It was grave, Jenkins knew. His own knees still quivered from the shock of that terrible flash at space. He had a sick, helpless sense of contraterrene war thundering down upon men everywhere in a dark and overwhelming avalanche of ruin and slavery and monstrous death.

He could see the frightened tension on the faces of the armed men behind the stern-visaged lieutenant. He watched Jane Hardin's tight fingers aimlessly ripping a lace handkerchief, until she saw what she was doing and smiled at him briefly with a troubled, wry amusement.

His own stiff face failed to answer, for he was thinking of the Drakes and little Rob McGee and all the other victims of the first seetee shot, waiting in Worringer's clinic for the seed of death to sprout and bloom and ripen in them. He

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was aware of the same dark seed in himself, and he felt cold and ill.

Martin Brand alone seemed calm and sure in the frightful face of the contraterrene war. Jenkins looked at the open candor and the courage on his uncle's red, cragged face, and felt warm again with an uncomfortable admiration. Perhaps Brand was a superior human type, he admitted that unwelcome thought reluctantly, entitled to a different code of ethics.

"Cheer up, Nicky!" Brand smiled at him, bluffly genial. "Mr. Gast has beaten better charges than any they can trump up against us, and no seetee war can be fought long without the aid of our corporation. We're riding high!"

Jenkins shook his head, uneasily silent.

"Well, lieutenant!" Brand turned briskly to the waiting Martian, and put his wrists cheerfully into the handcuffs that one of the taut-faced spacemen held uncertainly. "Shall we go?"

As they marched up the ramp to the cruiser, Jenkins managed to get a last glimpse of Jane Hardin's troubled face. She waved at him, smiling as if to cheer his sick despair, and then turned quickly to little Adam Gast.

Aboard, Jenkins wanted to stay with his uncle. That glow of reluctant admiration was still warm in him. He couldn't help hoping that this grim turn of events would somehow put a kinder light on the motives of Martin Brand, and make his corporation seem something better than a ruthless racket.

The guards separated them at once, however. Jenkins was escorted to a tiny cabin, furnished in austere simplicity with two chairs and a bare desk and crossed Martian sabers on the steel bulkhead. The lieutenant entered behind him, leaving the spacemen outside.

"Seat yourself, *Herr* Jenkins." The bullet-headed Martian dropped his voice cautiously. "You are alarmed, *ja?* But perhaps you need not go to jail."

Jenkins sat down watchfully.

"The High Space Guard, I must explain, is a mongrel force." The officer sat bolt upright in the other chair. "While in name we serve the political faction of the Mandate, our first loyalties naturally remain with our native planets. Is that clear?"

Jenkins nodded doubtfully.

"Now you will understand." The officer leaned intently toward him. "*Herr* Jenkins," his hushed voice rasped violently, "this will be denied if you ever speak of it, but I wish to secure your services for Mars."

Jenkins merely gasped.

"You need not go to jail," the harsh voice insisted. "Mars can transport you safely from the jurisdiction of the Mandate, and pay you well for the know-how to manufacture contraterrene weapons. You are interested, *nein?*"

Jenkins shook his head.

"Consider!" The Martian turned

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livid. "The Mandate officials and the Pallasport mob are already frightened. A few more seetee shots will cause chaos. The man to blame will suffer, *Herr* Jenkins."

Hoarsely, Jenkins whispered: "I am not to blame."

"The high commissioners believe you are."

"Not all of them," Jenkins muttered grimly. "One must know the truth."

"*Ach!*" The Martian studied him bleakly. "But which one?"

"I don't know."

"Better remember," the Martian snarled unpleasantly. "If you are not with us, *Herr* Jenkins, it follows that you are against us!"

Jenkins gulped against the flutter of his stomach, and shook his head again. Snorting unpleasantly, the officer flung the door open. Jenkins walked out of the narrow cabin to rejoin his guards.

He wanted a drink of water. The tight handcuffs hurt his wrists. But this was one step, he reflected hopefully, toward identification of the attacking power—and his own murderers. The lieutenant must be acting on the orders of the Martian commissioner.

Mars was eliminated.

The cruiser landed a few minutes later at Pallasport. Walking down the ramp between two watchful spacemen, Jenkins heard shouts and screams and a crackle of machine-gun fire.

A hundred meters from him on the civilian section of the convex field, towered the sleek, fat spindle of the liner *Thorium Star*. A muttering mob surged about a little knot of armed spacemen guarding her valves.

"What's all that?" Jenkins asked the rated spaceman at his elbow, a fair-skinned Earthman.

"Panic." The rating himself was hoarse and pale. "The liner's bound for Earth, and they're fighting to get aboard."

"Is there that much danger?"

"Rumors," whispered the uneasy spaceman. "They say the Free Space Party is rising against the Mandate, armed with seetee weapons developed on Freedonia." The man stiffened, abruptly conscious of his position. "Move along, Mr. Jenkins!"

Bullets snarled above them, from the battle at the liner's valves. Visibly alarmed, the two guards hurried Jenkins to the dark fortress of the jail annex, behind the Mandate court building.

The warden of the jail was a massive, bearded Callistonian Russian with an affable manner and sad blue eyes, who ordered the handcuffs removed and offered him an Earth-made cigarette.

"Mr. Jenkins," the big Jovian told him confidentially, "it is still possible for you to avoid the very grave charges which have been made against you."

"How?"

The warden looked around and lowered his voice.

"The Jovian Soviet maintains its

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own organization within the High Space Guard. That is an open secret. Our men and ships are ready to convey you to the Vladimir Ilich Ulianov Arsenal, on Europa—"

"I haven't made any seetee weapons for anybody else," Jenkins broke in sharply. "I don't intend to make them for you."

The blue eyes surveyed him sorrowfully.

"If you know so much, Mr. Jenkins—what power is now attacking the Mandate with contraterrene missiles?" Jenkins sat silent, and the Jovian sighed. "An honest answer can save you much discomfort."

"I don't know."

"If you really don't—" The massive Callistonian shrugged. "I pity you, Mr. Jenkins." He pressed a button to call a guard. "Throw the traitor in a solitary cell."

The cell was a cheerless rectangle of cold steel plate, furnished with a bucket and a filthy blanket. Jenkins started walking the narrow floor, reflecting that the Jovian Soviet was also eliminated.

A discreet hiss reached him, five minutes later.

"Mr. Jenkins—please!" The cold light showed the toothy yellow face of a sweating Venusian guard outside the bars. "I am honored, sir, to offer highly paid engineering position in employ of Venusian Empire."

Jenkins couldn't help a nervous laugh.

"Not to make seetee weapons!"

"Excellent opportunity to escape traitor's fate—" The Venusian started, as other footsteps sounded in the corridor. "So sorry, Mr. Jenkins. Allow no cigarettes today."

Jenkins leaned wearily against the rusty bars. That eliminated Venus. Of the four planetary powers, Earth alone was left. Earth meant Interplanet. A dull wrath burned in him, against the ruthless might of that ancient corporation.

Not because of his own murder—the seed of death in his own flesh seemed incidental, against the onslaught of seetee war. But he could see Jane Hardin's parting smile. He thought of the engineers dying on Obania, Rick Drake's wife and Paul Anders' wife and her unborn child.

He hated Interplanet for the blind greed that would deny mankind all the creative power of seetee; for the cynical arrogance that would forge the mighty wonder of the drift into deadlier weapons instead, into stronger fetters to bind humanity into the harshest slavery ever known.

He kicked the malodorous blanket into a corner and paced the iron floor again, waiting without much hope for Adam Gast. The man presently admitted to his cell, however, was another attorney, younger and more prepossessing.

"Name's Montieth." The visitor showed a card. "On the Interplanet legal staff. S'pose you know you're in an ugly situation, Mr. Jenkins?"

Jenkins nodded bitterly.

"But you've a powerful friend." Montieth smiled cheerfully. "Interplanet doesn't turn it's back on an

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Earthman in distress. We have a dominant position on the Commission, Mr. Jenkins. If that is not enough, we have other, less formal ways to help you. Will you accept our assistance?"

Attempting to conceal a bleak astonishment, Jenkins whispered faintly:

"What is the condition?"

"Nothing hard for a loyal Earthman," Montieth told him crisply. "You will immediately identify the power now attacking the Mandate. As soon as we can secure your freedom—we can do it today—you will accept a position as chief engineer in a new contraterrene arsenal—"

Jenkins burst into harsh laughter. For this offer eliminated Interplanet. It marked the last rival power off the list—but still the black plant of death was growing in his body; still the wild fever of seetee war was spreading through the Mandate.

"Tell me!" the anxious attorney was insisting. "Tell me who—"

Jenkins sat down weakly on the dirty blanket. He shook his head and tried to stop his nervous laughter. He didn't know who had killed him.

XIII.

Noon came, and a bowl of greasy stew. An hour later, Martin Brand and Adam Gast stopped in the corridor outside the cell. The guard with them stepped back discreetly. Clutching the bars, Jenkins whispered:

"Can't you get me out?"

Gast shook his sleek-haired head.

"I was able to secure Mr. Brand's release on bail"—his nasal voice was nervously hurried, his pinched face pale with unease—because he was never on Freedonia. But your case is unfortunately rather more grave—since you are the only able-bodied engineer known to have had actual experience working seetee. The preliminary hearing in your case has been postponed, and I'm told that bail will be denied."

Jenkins turned desperately to his uncle.

"Sorry, Nicky." Tall and confident in the gold-and-purple robe in which he had been arrested, Brand beamed sympathetically through the bars. "We're doing all we can—but this is an ugly situation."

Glancing about the filthy cell, Jenkins nodded feelingly.

"Worse than you might imagine." Brand's ruddy, rawboned face turned sober. "The whole Mandate's close to panic. Too many rumors. They're contradicted every hour on Mandate Light, but the censors are sitting on the facts—whatever they are—and everybody believes everything."

"Such as?"

"That the Martians have captured our Freedonia plant." Brand shrugged easily in the gaudy robe. "That a Soviet fleet is swinging into position to bombard Pallasport with seetee missiles. That Venus has seized Luna and blockaded Earth. That the asteroids have revolted and

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set up a Free Space Republic, under old Bruce O'Banion."

"Huh?" Jenkins caught his breath.

"All lies!" Brand tossed back his long dark hair, with that old familiar gesture that somehow carried a hint of careless arrogance. "But the people are excited. You're really safer here, Nicky."

Jenkins wet his lips to whisper: "Why?"

"The people blame you, Nicky." Brand's lean face was candidly regretful. "Since everybody else on Freedonia was laid out and you weren't hurt, there's a rumor you sold out to the enemy—whoever that is."

"There was another man," Jenkins rapped bitterly. "Jean Lazarene."

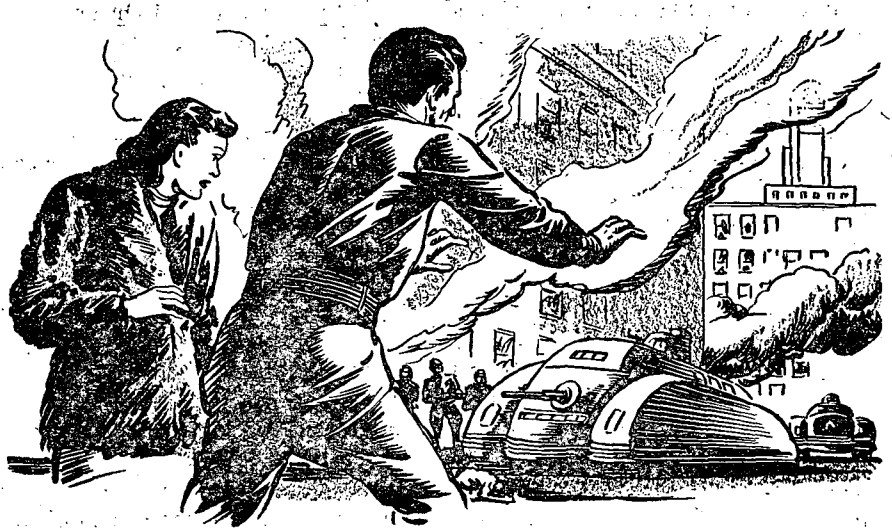
"Lazarene isn't available." Brand's great shoulders lifted helplessly. "You are. The mobs need a goat, Nicky. So does the government—until the identity of the attackers can be established. You're on the spot."

Jenkins clung to the bars, shaken with a sick bewilderment.

"But don't give up," Brand urged him cheerily. "Mr. Gast will pull every wire there is, as soon as the tension eases."

"That's right, Mr. Jenkins." Gast made a hurried yellow grimace of a smile, and tugged at Brand's sleeve to whisper something.

"You can trust us, Nicky." Brand turned back to Jenkins, his rugged face soberly honest. "And we trust you. Mr. Gast says that pressure may be put upon you, to place your



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seetee know-how at the disposal of one power or another—"

"There has been."

"See!" Brand nodded genially at Gast. "Nicky's all right." He thrust a lean hand through the bars. "S'long, Nicky. You can trust Mr. Gast."

Jenkins tried not to shiver.

"Will you do me one favor?" he whispered desperately to Brand. "Will you ask Miss Hardin to come and see me?"

For Jane Hardin had never acted like the predator Brand had called her. In this world of cynical and systematic double-dealing, she might turn out to be one friend. His heart slowed when he heard Brand's sardonic chuckle.

"Sorry, Nicky," the great man murmured carelessly, "but your pretty girl friend isn't with us any more. She resigned this morning." He snorted contemptuously. "Probably running for Earth, like all the frightened human carnivora."

Jenkins could only shake his head, in mute protest.

The rest of that long day, he paced his cell or sat on the cold steel floor, trying to follow the impact of contraterrene war upon mankind from the small signs he could see and hear.

He had no window upon the city, but he could see the taut gray strain increasing on the faces of the occasional guards who hurried past his cell. They wouldn't tell him anything, but he could watch their dull bewilderment and their slowly mounting dread.

Once he thought he heard the distant angry murmur of a mob. He thought there were shouts of harsh command, and screams of fear of pain. He knew he heard crackling bursts of gunfire.

After fifteen hundred, something shook the jail. The steel walls rattled and the air turned acrid with dust. Running feet echoed along the corridors. Men shouted and pistols cracked.

At first he imagined that the shock came from an explosion underground, set to sabotage the terraforming unit. He couldn't stop himself from sucking in a deep breath, as he waited for the city's precious crown of air to sigh away.

But the air was left, and presently an ominous quiet came back to the jail. Wondering if a seetee missile had fallen near the town, he looked anxiously at the geiger the jailers had left on his wrist. The occasional green flicker indicated only normal radiation.

Shrugging wearily, he walked the cell again.

For time was running out, like sand spilling through his fingers. His life was pouring away, as certainly as blood from an unstaunched wound. In three to five days, by Worringer's prognosis, the hemorrhages and the blindness and the vomiting would make him helpless.

His thoughts dwelt upon the incompleted transmitter on poisoned Freedonia, and the ingots of stolen

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condulloy in his uncle's private vault that could finish it. He tried to visualize the fever of war cooled by the creative magic of the power field—and he laughed again, bitterly, alone in his cell.

"Fool!" He rasped the accusation at himself. "How can one dying man make over all the planets?"

Did people really want a better world?

He sat scowling at the grimy steel wall, pondering that. Martin Brand himself had labored in vain to inaugurate the Fifth Freedom, twenty years ago. The obstacles that defeated him were human, not technical. And still the barrier was humanity—a great, sprawling, massive monster, as Jenkins conceived it now, absorbed with foolish fears and mean desires, with cheap schemes and senseless wars, wholly blind to the splendid new world the spatial engineers were ready to open.

"What's the use?" Jenkins muttered.

Was this what had happened to his uncle, he wondered, twenty years ago? His resentment for Martin Brand's selfish cynicism began to soften. If Brand had ever been through this, you couldn't blame him much for giving up.

He paced the steel floor, and waited again.

A nervous guard unlocked his cell at sixteen-fifty, staring at him with puzzled eyes.

"You're Mr. Jenkins?" The guard seemed uneasily respectful. "It's your preliminary hearing, called for right now. I'm to take you to the court building, and we must hurry." The Earthman peered at him again. "You must have friends, sir!"

"Have I?" He frowned at the guard, whispering anxiously, "What's going on?"

Looking up and down the corridors with a puzzling manner of haste and secrecy, the guard ignored his question. A frightened-looking turnkey let them out of the jail. Out on the street, Jenkins paused to look around him.

"Come along, please." The guard jerked apprehensively at his sleeve. "Judge Benedict is waiting."

Jenkins hurried on, trying to read the history written in shattered empty windows and the ragged tracks of machine gun bullets across metal walls. He started to the sudden groan of heavy gears behind him, and turned to see the gray mass and the frowning automatic guns of a pile-powered battle tank.

And horror caught his throat, when he saw a man's body sprawled on the pavement, ahead of the clanking tracks. He thought he heard a husky cry. He thought he saw an arm move feebly, clad in the rough gray of an asterite miner.

He tried to shout. He gestured desperately and pointed. But the tank didn't stop. The great metal cleats came down across the body. The head caved in. Something

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spurted. Jenkins looked away, feeling ill.

"Come along," rapped his escort.

Dazedly, he hurried on beside the guard, toward a side entrance to the court building. The tank lurched and pounded on beyond them. Swallowing hard, Jenkins didn't look at the smashed thing behind it. He gasped again:

"What's going on?"

"Asterite rioters tried to take the government buildings," the guard muttered briefly. "The tanks broke them up."

"But what about the seetee war?"

Shrugging, the guard showed a paper to an armed sentry in the doorway to the court building. The sentry nodded, and they hurried on through corridors as ominously empty as the street had been.

"Do you know—?"

"Nobody," the guard said grimly, "knows anything."

Beyond a deserted courtroom, they came into the chambers of Judge Benedict. A pink, perspiring Earthman, the judge was waiting impatiently behind a massive desk. Jenkins looked around hopefully for his uncle or Adam Gast, but the person he found was Jane Hardin.

She was waiting quietly in a chair near the worried-looking clerk of the court. She nodded a brief greeting, and turned expectantly to the sweating official. The judge cleared his throat and mumbled hurriedly:

"Nicol Jenkins? Plea of not guilty accepted. Bail set at one hundred thousand dollars. Bond approved."

Jenkins blinked at the quiet girl, interrogatively. Smiling briefly, she put a quick finger to her lips. Jenkins caught his breath and tried in vain to understand. Vaguely, he heard the judge's hasty voice:

"Prisoner released in custody of Miss Jane Hardin."

XIV.

Jenkins peered bewilderedly at the girl.

"That's all, Mr. Jenkins," barked the apprehensive judge, hastily stuffing papers into a brief case. You may go."

"But"—he wet his lips—"when will the trial be?"

"Who knows?" Judge Benedict shrugged, with an uneasy impatience. "Right now, I advise you to leave town before you get a bullet in your back."

He closed the brief case and mumbled something to the girl and slipped away with the pale clerk close behind him. The guard, Jenkins realized, had already gone. He was left alone with Jane Hardin.

"Thanks," he told her huskily. "I was going nuts in there—trying to imagine what's happening. I suppose my uncle arranged this?"

"No, I've left Seetee." She moved quickly to another door and looked cautiously out into the silent corridor. "Let's go—it's true the Martians and Jovians and Venusians will be annoyed to learn you're out."

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He followed her into the empty hallway.

"I never made a seetee weapon," he told her flatly. "I don't intend to start now."

Her taut face seemed briefly amused.

"But you're a seetee engineer." She frowned, glancing quickly behind them. "That will be enough for any enemy agent who happens to learn you're free."

He tried not to shudder as they hurried past the open doorway of a dark office. Cold alarm crawled up his back, but no bullet came. He breathed again, and whispered urgently:

"Please tell me what goes on."

"War."

"But who is the attacker?"

Her blue eyes searched him, oddly intense.

"All I know is what you told me at the Tor." A troubled wonderment slowed her voice. "I've seen more seetee flashes. All the hospitals are filling up with spacemen dying of seetee burns. But the censors don't let anything out."

"There was fighting here." He tried to believe that gray-clad body hadn't moved and gasped before the tank rolled over it. "What forces were involved?"

She checked him at a corner until she could study the gloomy corridor beyond.

"Just a riot of the rock rats." She beckoned him on again, her preoccupied voice cool with a casual contempt. "Seems the leaders of this underground Free Spaceport tried to take advantage of the general confusion. The asterites tried to revolt."

Jenkins stiffened to a bitter resentment. Once he had felt a little of this Earth-girl's sense of superiority to the crude people of the rocks. That was before he knew such asterites as old Jim Drake and Rob McGee and Paul Anders' gray-eyed wife.

"Crushed, of course," she was saying. "At least here at Pallasport. The rumor is they took Obania—"

"Obania!" His whisper was sharp with dismay, for his mind could see red-haired Karen Drake again, and the wife of Anders with paint smudged on her brown vivid face and her body heavy with the child. He didn't want a Mandate tank rolling over them.

"Just a rumor," Jane said. "Anyhow, the asterites aren't much of a threat—men with drills and hammers can't fight atomic missiles. The real danger to the Mandate is this unknown attacker—"

Her hurried voice paused, as they came to another corridor. Peering around it, she beckoned Jenkins back into a little alcove which held a water cooler. Frowning uneasily, she looked at her watch.

"We must wait five minutes," she whispered. "Until an Earthman replaces the Martian sentry at the rear door."

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"Where are we going?" Jenkins gripped her slender arm. "What's your game?"

For a sudden dark suspicion had taken hold of him. She was beautiful—but that, he realized, was all he knew about her. Beauty shouldn't matter to a dying man. He could understand her superior attitude toward the people of the rocks; she simply didn't know them. But it wouldn't be so easy to forgive the complicity she must have had in his uncle's cynical schemes.

"What game could I have?" Her limpid eyes widened innocently. "I only want to help you, Nick."

He peered hard at her taut face.

"If my uncle didn't send you," he demanded harshly, "who did?"

No ordinary secretary, obviously, would have been able to make the complicated and expensive arrangements for his release. He felt a bleak mistrust stiffen his face and narrow his eyes, but the girl smiled slightly.

"Nobody sent me," she insisted softly. "I just thought you needed help."

"I do," Jenkins admitted bitterly, "but you told me at the Tor that you don't believe in the Brand transmitter."

"That was before I saw the war begin." A brooding dread shadowed her blue eyes and pinched the lean loveliness of her face. "Before I saw tanks smashing down an asterite street blockade, and machine guns raking unarmed men and women running for a place to hide."

Her voice was hushed and grave.

"I got to thinking about what you told me, Nick. At your uncle's office this morning, I picked up that book of his and read the preface—about the Fifth Freedom. That made up my mind. I told Mr. Brand we must help you get the transmitter started."

"What did he say?"

"Just laughed." Puzzlement wrinkled her nose. "I don't quite understand your uncle, Nick. He said he used to be the same kind of idealistic fool that you are now. But he said the transmitter couldn't possibly stop the war. You would be safer in jail, he said—that made me mad. I quit—and here I am!"

"That's the truth?" Desperately, Jenkins studied her calm face. "You really mean to help?"

"Haven't I proved it?"

He shook his head. Her low voice had a throb of conviction and her cool eyes looked honest. He wanted desperately to like her and trust her. But doubt clung to him.

"Anyhow, you must go along with me." Her brief, tiny smile mocked his misgivings. "Unless you want that bullet in the back!"

"Lead on." Jenkins shrugged bleakly. "I've got nothing to lose."

Not even my life, he added silently.

Watching the sober little crinkles that creased her fine nose as she frowned at her watch again, he felt a bright, warm wistfulness come over him. If he weren't dying—

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"It's time." She stepped quickly to peer around the corner, and signaled to him urgently. "There's to be a car parked across the street."

The sentry at the door was a bronzed Earthman in the uniform of the High Space Guard, who nodded slightly at them, blank-faced, and whispered sharply:

"Move on—fast!"

Out in the street, Jenkins could imagine guns thrust out of all the windows behind him. He tried to keep from moving conspicuously fast.

"Don't be too casual." The girl caught his arm to hurry him across the empty pavement to a small electric car. She ignored a gray battle tank stopped at the street intersection. "Get in," she whispered. "You drive. I've official passes."

Nervously, Jenkins started the car. The girl thrust two small gray cards into his fingers, and he glanced at the names. N. Jenkins, court clerk. J. Hardin, court typist. A guard near the tank looked at the cards and snapped:

"Get along, mister—and get off the streets."

Jenkins drove on.

"Well?" he muttered at the girl. "Now what?"

"Now you're on your own," she told him softly. "I've got you out of jail, and the rest is up to you." Her cool blue eyes seemed to challenge him. "What are your plans, Mr. Jenkins?"

"Plans?" He gave her a curt, mirthless laugh. "How could a dying man make plans—when he must fight the secret agents and spatial fleets of an unknown planet, with such a dubious ally as this perplexing girl, to gain a goal that practical men called quixotic?"

But he stopped the laugh and drew his shoulders straight.

"I left a ship on the emergency field," he told her quietly. "And there's condulloy enough in my uncle's hoard on the Tor. Perhaps you can help me get it?"

Her eyes widened slowly.

"Piracy?" she whispered.

"Get out if you like." He slowed the car. "But that metal was bought for the Freedonia plant. I'm going after it."

Her level eyes looked at him hard.

"Drive on, Mr. Jenkins," she said softly. "We've got a war to stop."

TO BE CONCLUDED

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BOOK REVIEW

"Final Blackout," by L. Ron Hubbard. Hadley Publishing Co., Providence, Rhode Island. 154 pp. Ill. $3.00

Few serials in this magazine have had the immediate impact of L. Ron Hubbard's memorable account of the British officer known only as the Lieutenant. It appeared in 1940, when it appeared to some that the final blackout of Western civilization which he described was more than possible. Now that this war—or stage in the war—has passed, the grim fact remains that the story is one of our own near future.

In the author's words, the Lieutenant "had seen, in his lifetime, the peak and oblivion of flight, the perfection and extinction of artillery, the birth and death of nuclear physics, the end product of bacteriology, but only the oblivion, extinction, and death of culture." He was born and bred in and for war; he lived to be exiled in a ruined Europe by the quarantine against the dreaded soldiers' sickness; before he died he had increased his command to include all England, and had successfully defended it against a greedy America which was licking up the crumbs of broken nations. He is one of the remembered characters in the years Astounding SCIENCE FICTION has been published, and rightly so.

"Final Blackout" was written in 1939. Its author has since served through the war he seemed to describe. He disclaims, in a preface, any pretension at realism in his story. But—he has not changed it, nor should he have done. This will probably be the most lasting volume Hadley has yet published.

P. Schuyler Miller

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

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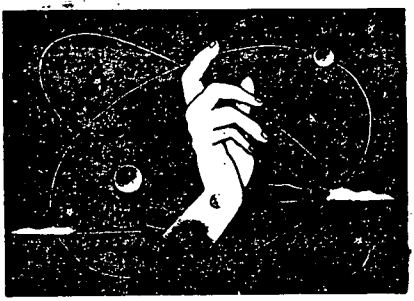

BRASS TACKS

And S Doradus is, then, a hyper thyroid son?

Dear John:

First the ratings: "The Catspaw" takes first. No comments—Smith took care of those for me. Well thought out yarn, although some of his reflexive and transitive postulations are somewhat screwy. I'll have to read it again. Imagine it was hard to work both sides of the argument in without making the tale drag.

As for the rest of the September issue, second came "Dreams Are Sacred." This was a scream! De Camp better look to his laurels. This Peter Phillips has opened up an entirely new facet in s-f humor. That, if simmered down, could have gone in *Unknown Worlds* nicely.

"The Great Air Monopoly" snags third. Fine stuff, but weak on the science angle. Your times-to-come preview had me up in the air expecting the worst—got something which seemed oversimplified because I was prepared for something entirely different. Careful with those terse editorial comments—they wreak havoc.

"The Gorgons" and "Dance of a New World" tie for fourth place. Can you evaluate such a rating? Again the title of the former spoiled it a bit for me. You give me, at least, that pernicious habit of abstracting each title to the limits of its semantic content. I think you have used Medusa for Ted Sturgeon's yarn. As far as the analogy goes, Grimaldi looked on *one* of the race of "gorgons," logically it was the Medusa. But you have used it previously. 'Tch, 'tch.

"Inheritance" places fifth. All were quite entertaining yarns.

Your editorial drove me to think-

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ing once more of an adaptive mutation. At present, life forces in organic colloidal matter up through the higher primates are manifest only to our present knowledge—in the universe for that matter—more-or-less within the limits of the temperate zones with all respect to Terra's 23½° axial tilt. That and the depth below the ground where microbes cease to exist up to the tenuous outermost reaches of our ionized atmosphere where I wonder if research has been conducted in detecting nonactivated viruses.

Summarizing, a thin, ringlike strip with hardly any thickness at all, which under present ecological conditions, is capable of supporting life.

I would certainly love to tackle the theme of the adaptive mutation and its problems of shaping its environment if I had the time. As we know, Man the animal has somewhat if not sanely—Korsybski—warped and distorted his surrounding conditions to suit himself. Van Vogt has touched spots here and there in relation, and your own "We're Not All Human" article some time ago did the same, but as yet, the possibilities are yet unlimited. Of course, "The Players of Ā" will have been on the stands some time as I write this, and I expect to see him touch on several points of his Gosseyn-superman and this theme at that time.

Man can either continue as a social-group his bungling present system of progress, or can slow down enough in the race for immortality to discover and harness the secrets of his nervous system.

Russell gets humans tempered to gamma-radiation; Kuttner gives us telepaths, also with Heinlein, the heirarchy of genetic-immortals. Knight's submarine beings in "Crisis in Utopia." Plus many others. Heinlein and Kuttner are the only ones who have exploited the theme to any length, and at that—the same situation—of the long-lived and their conflict, both in the Keeps and in the Clan.

I would elaborate on certain points of Richardson's fine article, but for the fact of time again. Strictly as a nobody, I would recommend the acquisition of "ASTRONOMY," by Richardson and Skilling, H. Holt and Co., revised edition, 1948, 692 pages.

So "infrasun" would be the tag for diffuse nebula globules, such as Messier 8 in Saggitarius: B. J. Bok finding several last year ranging from 10,000 to 35,000 a. u. in diameter.

That makes van Maanen's star an "ultrasun." It is my contention that our famed "hyper-space" would exist, rather in the heart of a white dwarf, than stf writers would reason—just existing any old place.

And the "Horse Head Nebula" in Orion, and Bernard 133, would exist in hypo-space. To the end that, relatively, our "static" universe, if there is such a thing—kill the heretic—is a system which lies somewhere

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between the hyphenated hypo-hyper space. Depending solely on whether or not, the matter in a given area of space is in an associated state or not.

But I'm sleepy and I'm going to hit the sack. Thanks for the Unknown anthology ahead of time—Bill Entrekin Jr. Americus, Georgia.

I think he's right. And let's add the effect of the old American tradition of giving the—apparent—loser who made a good, hard try a vote of appreciation!

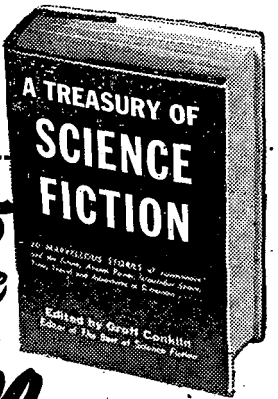
Dear Mr. Campbell:

Science fiction and fantasy readers are well acquainted with the Cassandra paradox. I imagine they may be more receptive than others to the idea that the recent "miracle" election may have been due to the faith of a large number of people in the accuracy of the pollster's predictions.

Obviously, at the next election, people will be more skeptical, and the predictions will have a chance to be more valid.

Science fiction writers have for about two decades—perhaps more—pointed out that if prediction is to be believed *and* is to be accurate it must not fail to take into account the results of its own predictions!

Despite Mr. Bean and the Staley Milling Company I think you have good material for an early editorial. —Benjamin Keller, 323 N. California Street, Socorro, New Mexico.



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Asimov is now working on the story of the Second Foundation!

Dear John:

The September ASF arrived yesterday morning, and it was promptly digested. It came in at eleven ay yem. Reading from the front of the book straight through, as is my habit with ASF, the issue wasn't too exceptional, although it wasn't too dull, by any means.

Anyway, for the Analytical Lab, here're my judgments:

1. Dreams are Sacred
2. The Great Air Monopoly
3. The Catspaw
4. Inheritance
5. Dance of A New World
5. The Gorgons

I'm listing two fifth places—although they really should be sixth—because both weren't equally good. Richardson's "Paper Planets" was kinda confusing. I got lost somewhere near the fifth page, which is somewhat unusual. I can usually figure these things out. Bonestell's cover, surprisingly, wasn't so hot either. Oh well, I'm being especially critical. This month, anyway.

Your editorial was neat. I've thought along those lines, but I've never hit that exact topic. My reasoning went along: just think of all the morticians who'd go out of business if we were practically immortal!

Anyway, I herewith rank Peter Phillips' "Dreams are Sacred" as the second best story of the year. By the rating scale I worked out a year or so ago the blamed thing hit .891, which indicates something just a little short of a classic. The best story of the year will undoubtedly be van Vogt's "Players of Ā."

Looking back to the Brooklyn cowboy's thiotimoline article, be it hereby known that Asimov has hereby qualified for the Olympic scotch team. The article demonstrates the best year's use of scotch yet. Otherwise, N. C.

While we're talking about the cowboy, I've reasoned the location of the Foundation. The Second Foundation, that is. It exists in the minds of the Second Foundationers. The Second Foundation, supposedly at the other end of the Galaxy, was merely a semantic term. What's-his-name probably foresaw something like the MULE, so he simply planted the psychological . . . uh . . . block in the minds of the Foundationers who should know of such matters. It was thusly that it should be so difficult to locate. The Mule, being able to control only emotions, was thus barred from learning the true location. The true location deep in the thalamus, probably. Does that answer, Miss McIntyre?

Going back to Ā, it's surprisingly simple to learn; in fact, it practically pushes itself at you; but you have a job putting it into practice, not to mention explaining it to somebody else. Van Vogt's explanation—via "World of Ā"—was and still is, the easiest way to accomplish such.

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Point I forgot back there. Remember in "Book of Ptath," the seven tasks Ptath had to do, the spells he had to break, before Ineznia could gain complete God Power? They were simply psychological, and actually had no real physical basis. But Ineznia thought they were real. That's the same sort of thing the Second Foundation is. Ergo . . . I am a resident of the Second Foundation.

For that matter, I'm Ptath—Fred Ross Burgess, Chapel Hill, North Carolina.

We might print a frame like a baseball score card for readers if this system of rating became popular. But I suspect it's too complicated.

Dear Mr. Campbell:

Here are my ratings on the October issue. I notice that about once every six months a letter is published suggesting something to the effect that you compare the contents of different issues. Usually, of course, these letters are from new readers or fans not previously heard from. If there are many such readers, may I suggest that the universal use of a rating system similar or comparable to the one I use might bring about such comparisons. This particular system undoubtedly would need improving.

Stories are divided into groups as Science-Fiction (S), borderline mixture of science-fiction and fantasy (N), fantasy (F), Articles (A), and Hoaxes (H). All stories are rated as to Thought or Idea (T), Plot and quality of writing (P), and Melodrama or interest (M). Fiction is also rated for characterization (C) while articles including hoaxes are weighed for their veracity, reliability, plausibility, and importance—(V). Editorials are classified as articles.

Ratings run from 0—impossibly bad—to 10, impossibly good. 0 1, & 10 I have never used. The average of your T, P, M, & C—or V—ratings determine your fiction—or article—rating. If all group ratings are equal—say six—the story rating is that # plus .5 — 6.5. If the group ratings differ they add or subtract as follows: P + or — .4, T ± .3, M ± .2, C ± 1 for fiction; V ± .4, P ± .3, etc., for articles. Simple, isn't it?

For an example of how this works, here, I repeat, are my October ratings:

1. "Muten," by D. H. Munro
   S=7.7 T-6 P-8 M-8 C-7
2. "School for the Stars," by J. D. MacDonald
   S=7.6 T-6 P-8 M-8 C-6
3. "Unite and Conquer," by Theodore Sturgeon
   S=7.5 T-6 P-8 M-7 C-6
4. "The Players of A," by van Vogt
   S=6.7 T-7 P-6 M-6 C-5
5. "Tiger Ride," by Blish & Knight
   S=6.3 T-7 P-5 M-5 C-6
6. "The Hero," by Joseph Farrell
   S=5.0 T-6 P-5 M-6 C-5

The stories average 6.97

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Articles:

"Endocrinology Is Tough," by Winter

A=7.8 V-7 T-7 P-8 M-7

The Editor's Page: "Elder Brother Mars"

A=7.7 T-8 P-7 M-6 V-7

The magazine averages 7.16.

The above was work! It is really too early to rate the serial. The Muten story is just good humor and happened to appeal to me. The rest of the stories make up a superior issue.

The above opus I submit—as did Dean Swift—as a modest Proposal to settle a grave and recurring problem. May we fans have your opinion on it?—Richard S. Sanders, 585 E. Union Street, Wytheville, Virginia.

I know, Sprague, but an invention dropped because currently unworkable is usually so buried and forgotten as to be practically unknown. The athodyd was heard of in 1910; by 1920 it was unheard of! The same applies to microwaves — vide Hertz — and waveguides!

Dear John:

On page 5 of the November 1948 issue, in connection with your editorial about what the engineers of 1920 would make of a modern guided missile, you say: "The athodyd being unheard of in 1920 . . . ."

Not so. The ram-jet engine was originally developed by Réné Lorin, a French artillery officer, between the years 1907 and 1910; in fact it is still called the "Lorin duct." Lorin himself proposed using it in a guided missile launched from a catapult, and steered to its destination by radio impulses from airplanes spotted along its course; he proposed also incorporating barometric altitude control—analogous to the standard torpedo depth-control mechanism,—gyroscopic stabilization, and servomotors. Quite a guy.

The trouble was, of course, that while his ideas were sound, they required a multitude of minor engineering inventions and improvements to make them practical, and by the time these improvements had been perfected Lorin was forgotten and his patents, if he had any, had expired. He was somewhat in the position of an ancient Egyptian who had the idea for a bicycle but no rubber, steel tubing, ball bearings, lubricating oil, et cetera to reduce it to practice with.—L. Sprague de Camp.

It isn't necessary to stop fighting for your ideals just because you stop using a club; argument is slower, takes more mental effort, but it is more apt to leave the desired goal intact!

Dear Mr. Campbell:

The December issue of Astounding was heartening indeed. For the

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first time since I started reading the magazine two years ago, an issue has appeared containing nothing but deep-space stories on an interstellar or galactic level. Heaven be praised! Perhaps the heralded Renaissance of science-fiction is still a long way off. My ratings for this month:

1. "Genius": There is really very little to choose from among the top three stories in this issue, but I have finally decided that "Genius" rates first, in my opinion, by a hairbreadth. I found it rather hard to say why I liked this story. I most violently disagree with the tenets of pacifism and the assumption that there is an orthogenic factor in evolution, but I found it possible to ignore the supposed applications of the Imperium's problems to our own time, and also to ignore such statements as that saying that republics were really ruled by mass hypnotism through the newspapers—Anderson must have written this story before the recent election. As a story, however, ignoring the various morals and misconceptions, it was splendid. The picture of the Imperium's condition was very well done, as was the description of the colony of geniuses. Under their beneficent rule, a new intergalactic empire based on security and peace, and also progress, would probably have resulted. Such a system is one that has always appealed to me.

2. "The Players of Ā": A close second. Van Vogt is at last bring-

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ing the issues and the conflicts of his stupendous galactic war clearly out into the open where one knows what is going on. The battle of Gosseyn and his few allies against a galactic empire is inspiring indeed. But why, oh why that cosmic chess player? If only he didn't exist, how different things would be, and how much more effective would be the story! I must say that for a piece on a chessboard Gosseyn is doing the most extraordinary things. I should think it would confuse the game a little.

3. "Late Night Final": I hate to put this third, for it is extremely good, and only its slight lack of sweep in comparison with the other two top stories leads me to place it thus. This is Russell at his best, as he was in his magnificent "Metamorphosite." If he has regained this old and splendid style of writing, we can all forget about "Dreadful Sanctuary." One thing about this story puzzled me, though. I still don't understand what happened to the people of Earth. Someone spoke of emigration, but why and to where?

4. "Bureau of Slick Tricks": Anything with a galactic background will get by with me, but I can say no more for this odd little piece of work. The picture of interstellar trade, a la the Foundation, was interesting, but the rest was dull and rather silly. I don't like Fyfe's approach to the problem of non-human races at all.

The editor's page was fine, but unfortunately there wasn't much of anything else in your regular reader's departments. Heavens, no Lab and no "In Times to Come"! Couldn't you have cut a page or two off "Electronics—New Style" and have made room for them? And Brass Tacks reached a new low, with only three letters.

Mr. Bade's comments on ". . . And Searching Mind" set my hair on end. The best novel you have ever printed? If it was, I should have abandoned science fiction long ago. Does Mr. Bade really think that this tale of defeat and despair and alien domination is superior to "Slan," to "Final Blackout," to "The Weapon Makers," to "The World of Ā," and, above all to the titanic super-epics of the Lensmen? I heartily agree with Mr. Bade's high rating of the Simak series, but fail to see what this has to do with Williamson. I approve of novels based on conflicts of philosophies—in limited numbers, that is— but I do not approve of such a novel in which an unhealthy philosophy is the victor. So Ironsmith is a "high-order approximation" of the perfect man! Claypool and White, being fighters, naturally have no good qualities at all. I deplore the present trend toward pacifism in science-fiction, and can only say that if our civilization ever stops producing men with the ideals and the courage of Claypool and White, we might just as well throw in the towel and wait for the robots, the insects, or the cosmic

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chess players to take over. In conclusion, let me paraphrase the all-knowing Epictetus quoted by Mr. Bade, in the fashion that such problems might have been faced by such men as Claypool and Kimball Kinnison:

"I must die. But shall I end my fight for all that I hold dear as long as the breath of life remains within me?

"I must be imprisoned. But shall I make no effort to escape to carry on my battle unto death against the forces of evil?

"I must suffer exile. But shall I let this hinder my eternal resistance?"—Warren Carroll, South Berwick, Maine.

"The Lungfish, The Dodo and The Unicorn," by Willy Ley he means. Wonderful reading on a winter's night!

Dear Mr. Campbell:

November analysis:

1. "In Hiding," which is my nomination for story of the year. Oh, happy day, when an author can present the touchy theme of Sapiens' downfall with such charm and delicacy of handling!

2. "Players of Ā": So far this serial has moved too slowly; but the two spot is chiefly the result of confidence in vV's yarn-spinning ability. Calculus of probability gives him a .95 chance of picking up next ish.

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3. A tie between "Period Piece" and "Love of Heaven" with a slight edge for the former.

4. "Expedition Mercy." I'm sorry to toss Dr. Winter's item down here, but his excellent ideas failed to compensate for the lack of writing skill. However, a large E for effort.

The articles were both well done. How about having your Mr. Miller review Willy Ley's remarkable new book? Let's see—I think it was back in November of '45 that Ley's ". . . Giants In Those Days" appeared, discussing the mythical and factual oddities of the human race. In the newly published book, we get somewhat the same slant on the animal world. Interesting.

Art work is looking up again. Orban and Rogers are much more effective in scratchboard than in plain ink sketching. Guess the Schneeman return was a false alarm though.—J. C. May, 2334 N. 76th Court, Elmwood Park, Illinois

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Sequel to "In Hiding" in this issue!

Dear Mr. Campbell:

I have just finished reading Wilmar A. Shiras' story "In Hiding," in the November issue of ASF, and am of the opinion that there just must be a sequel to it. The idea behind it is something that is entirely new to me and there is so much left to be said about Timothy's later life and his associations with Dr. Peter Welles. I have never written to any stf magazines before, but this story made such an impression on me that I think it would be only fair it be continued. Of course, I am only one voice in many, but I am sure I am not alone in my opinion.

As for the other stories in ASF, I think that they are the best on the market. I don't mean to be flattering just to get this letter published, that is a secondary consideration, but there is really some intelligent thinking behind your stories. I have been reading stf for about twelve years now and as long as I can remember, I have been more completely satisfied with your selection of stories than any other stf magazine on the stands. Although they are sometimes a bit deep for the layman's mind, the general idea behind the stories always seems to have some probability to them. They are always on a higher plane of thought than the other magazines—I read them all—and they really leave a person thinking of the unlimited possibilities in the hands of modern man. As has been the case before, stf seems to be forecasting the great things to come.—Cpl. Richard C. Hyatt, Station Dispensary, Kirtland AF Base, New Mexico.

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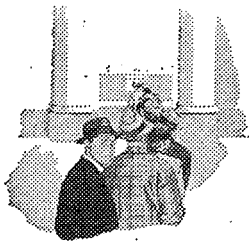

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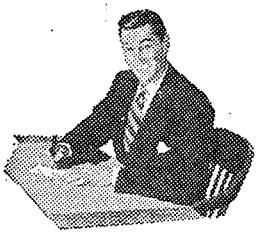

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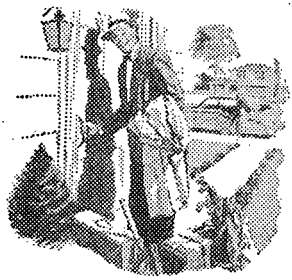

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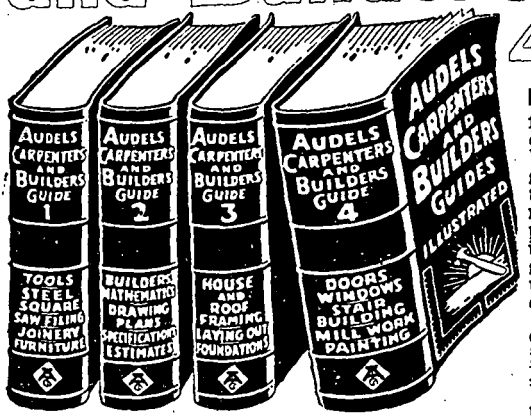

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